RCRA Facility Investigation

Perimeter Investigation Work Plan

Prepared for

The Hoover Company

Voluntary Corrective Action Program for
Plant 1, North Canton

December 1999

Revised February 2000

CH2MHILL

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Submitted to

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1. Introduction and Investigation Objectives

The Hoover Company (Hoover) is initiating a Voluntary Corrective Action (VCA) program through which to address RCRA Corrective Action (RCRA CA) obligations at Plant 1 located at 101 East Maple Street in North Canton, Ohio. VCA program activities will be planned and implemented in accordance with appropriate regulations and guidance, and will be designed to be protective of human health and the environment. This program, which will be conducted under the terms of a Voluntary Corrective Action Agreement with USEPA, is expected to accomplish the same objectives as a program that would be conducted under a permit or an order.

Consistent with USEPA's Final RCRA Corrective Action Plan (CAP; May 1994), an initial task in the VCA program will be the RCRA Facility Investigation (RFI). This Work Plan has been prepared following USEPA's RCRA guidance (CAP; May 1994). Hoover's RFI will be conducted in phases, the first phase being done along the facility perimeter. The object of the perimeter investigation is to gain a better understanding of physical and environmental quality conditions at the facility boundary. Physical and chemical data will be collected during the investigation to achieve the following objectives:

- Identify whether potentially site-related constituents are present at the facility boundary, and, if present, determine constituent concentration distribution
- Provide data that will allow an assessment of potential constituent migration and support an analysis of potential risks to human health or the environment from constituents identified at the facility boundary
- Identify and prioritize areas where additional onsite or offsite characterization is warranted to determine whether migration has occurred
- Provide data that will support evaluation and selection of source control and management measures.

This document outlines the data collection activities that will be conducted to achieve these objectives. Data quality objectives (DQOs) have been developed to provide the rationale for the data collection activities. Information developed during previous facility investigations has been evaluated to develop the data collection approach presented in this work plan.

2. Facility Background

A brief description of the facility background is presented in this section. For detailed descriptions of the facility location, historical manufacturing practices, materials and waste management practices and surrounding land use, the reader is directed to two documents referred to collectively as the Current Conditions Report:

- Material and Waste Management Areas Inventory, Hoover Plant 1, North Canton, Ohio, November 1997 (CH2M HILL 1997)
- Technical Memorandum: Regulated Unit Geoprobe Soil and Groundwater Sampling for The Hoover Company, North Canton, Ohio, May 26, 1999 (CH2M HILL 1999a).

2.1 Facility Location and Description

Hoover Plant 1 is located in a mixed residential, commercial, and industrial area near the center of North Canton in Stark County, Ohio (Figure 2-1). The manufacturing and warehouse space encompasses 24.6 acres of the 86.6-acre facility.

The plant is bordered to the north by residences and North Canton Hoover High School; to the east by the high school football field and residences; to the south by residences and the local YMCA; and to the west by commercial establishments and residences. North Canton Hoover High School is located about 1,000 feet north of plant operating areas, across 7th Street. Several public streets divide the facility (namely Orchard, Hower, Witwer, and East Maple streets).

The facility can be divided into two primary active areas, based on current and historic uses: the North Yard and the Plant Area (Figure 2-2). Most of the current and historic chemical and waste management and treatment practices occurred in the North Yard. The Plant Area contains most of the manufacturing processes. Access to manufacturing buildings in the Plant Area and exterior materials management areas in the North Yard is controlled by fences and locked structures that surround the exterior parts of the site.

The public has access to some parking lots on, and to public streets that cross Hoover property. There is also public access to baseball diamonds located in the northernmost part of the facility. There is limited public access to soccer and practice football fields, also located in the northernmost part of the facility.

2.2 Manufacturing Operations Overview

Hoover has owned the property on which the Plant Area is located since 1873. In 1921, Hoover purchased the area between Hower and 7th Street including the North Yard. Hoover originally manufactured leather goods and had a tannery on the property. Between 1907 and 1918, both electric sweepers and leather goods were manufactured onsite. Before World War II, Hoover manufactured electric sweepers, household appliances, and other miscellaneous items. Commercial manufacturing was interrupted during the war in support of the war effort. Soon after the war, the plant began manufacturing toaster ovens, coffeepots, hand mixers, and electric and steam irons. Current operations mainly consist of compression and extrusion molding of plastic parts, motor and hose manufacturing, and assembly of vacuum cleaners, polishers, and service parts. More detailed information regarding historical manufacturing operations is presented in the Material and Waste Management Areas Inventory, Hoover Plant 1, North Canton, Ohio (CH2M HILL 1997).

2.3 Waste Generation and Management Overview

Most of the wastes associated with past operations at the plant have been wastewater and wastewater treatment sludges. Other wastes included plating sludge, used oil, and small quantities of spent solvents. Detailed records of waste management and handling before the 1970s do not exist.

Based on the information available, liquid process wastes were discharged to the storm sewer before the mid-1930s, as was common practice at the time. Starting in the mid-1930s and through 1944, liquid wastes were discharged to sanitary sewers. In 1944, Hoover constructed the first onsite wastewater treatment pond. From that time on, wastewater was routed to wastewater treatment ponds for settling, pH adjustment, and oil and solids removal. Between 1944 and 1980, the oxidation of cyanide and metals occurred in the plant and the wastewater was discharged to the ponds. Cyanide was deleted from the processes by 1980. Treated wastewater is now discharged to the storm sewer that leads to an unnamed tributary of Nimishillen Creek and is regulated by the plant's NPDES permit (CH2M HILL 1997).

Solid waste management practices at the plant have consisted of both offsite and onsite land disposal. Based on a review of aerial photographs, it appears that onsite land disposal began as early as the mid-1930s. It is believed that wastes from plating and degreasing operations were disposed of in natural onsite low-lying areas until 1968. The wastes consisted of wastewater treatment sludge from plating operations and spent halogenated and nonhalogenated degreasing solvents. Small quantities of paint solvents and cyanide salts from heat treating operations may have also been disposed of onsite. Since the early 1970s, sludge has been disposed of offsite at an appropriately permitted facility. Details describing what is known about historic waste management, and specific areas at the site where these practices occurred are identified and listed in the Material and Waste Management Areas Inventory. Approximate locations and boundaries of these areas are illustrated on Figure 2-3.

In general, few documented releases have been recorded. Limited soil removal has been performed in response to releases documented at two areas: the former drum storage area (referred to as the Regulated Unit), where 15 cubic feet of soil were removed in 1987 after three drums were observed to be leaking; and the former hydraulic oil tank farm, where a quantity of soil was removed in 1992 when the aboveground storage tanks were removed (CH2M HILL 1997).

For the purpose of developing the sampling and analysis approach for this investigation, known information (summarized in CH2M HILL 1997) regarding types of wastes generated, managed, and potentially released was considered when developing the list of chemicals targeted for analysis (generally referred to as the target analyte list, or TAL). Information regarding the approximate size and location of each unit (together with known site geologic and hydrogeologic conditions) was considered when identifying perimeter sample locations and spacing.

Three areas identified in the Material and Waste Management Areas Inventory are of particular relevance to this perimeter investigation: Site A, Site B, and the Regulated Unit (Figure 2-3). Site A and Site B are considered to be relevant because they are closest to the facility perimeter.

Site A is a CERCLA-listed site that is roughly an oval shaped former land disposal area (believed to be about 0.8 acre) located along the western boundary of the facility. Between roughly 1920 and 1948, wastes such as enameling and powerhouse sludges, and miscellaneous off-specification products (such as WWII helmet liners) were disposed of in this area. Site A was regraded and paved for use as a parking area by 1958.

Site B is a CERCLA-listed site that is an irregularly shaped former land disposal area (roughly 4.5 acres) in what was once the northeastern corner of the facility, along the existing property boundary. Between 1948 and 1968, dredged sludge from the wastewater treatment ponds were placed in the area. Site B is covered with clean fill and paved as a parking area.

The Regulated Unit is a RCRA-regulated former drum storage area under interim status located in the North Yard. It is an outdoor, open, uncovered, flat area. The unit was used from 1930 as a general storage area and as an interim status hazardous waste storage area from 1980 until July 1989. Waste managed in the area included spent solvents, spent methylene chloride, spent paint wastes, metal-containing wastes, electroplating wastewater treatment sludge, and waste containing the plasticizer bis(2-ethylhexyl)phthalate. Since July 1989 when Hoover submitted a closure plan to Ohio EPA, Hoover has investigated the soils and groundwater at and surrounding the Unit. The environmental quality information collected since 1989 at the unit was used as the basis to identify sampling approaches and data quality objectives for this perimeter investigation.

2.4 Site and Regional Geologic and Hydrologic Conditions

Information presented in this section is a compilation of site-specific surficial observations, review of publicly available regional documents, and data collected as part of previous site-specific geotechnical or environmental investigations.

2.4.1 Site Topography and Surface Water Drainage

Topography on the Hoover property is generally flat, sloping slightly to the northwest. Available data suggest that a local surface water divide may exist on the Hoover property (Floyd Brown Associates 1988). Surface water runoff from the Regulated Unit is to the east, discharging into a vegetated area north of Parking Lot 7. Runoff from the northern part of the North Yard discharges to a stormwater collection drain south of the ball fields. Stormwater runoff from other parts of the facility could discharge to the west, flowing over the surface to ditches and ultimately to the west branch of the Nimishillen Creek.

2.4.2 Surface Water Bodies and Ecological Resources

Four onsite wastewater ponds, covering a combined area of about 1 acre and ranging in depth from 4 to 6 feet, are located in the northwest section of the North Yard. The ponds are bermed and do not receive runoff from the North Yard. Although the ponds contain standing water, they are managed for industrial wastewater treatment purposes and are not considered aquatic habitat.

During periods of heavy precipitation or snowmelt, standing water may be found in parts of the North Yard south of the ballfields. Because these periods are temporary, it is unlikely that the areas of standing water would represent habitat for aquatic biota or birds.

Although it is unlikely that there is significant habitat located at the facility (and little activity has been observed to date), an ecological evaluation will be conducted as part of the perimeter investigation. The field evaluation will be performed to verify the presence or absence of habitat, ecological receptors, or potential exposure pathways at the facility.

The nearest permanent offsite surface water body is an unnamed manmade pond about 1 mile southwest of the plant, in a public park. The pond is fed and recharged by the municipal water supply system. Due to the distance of this pond, and both site-specific and regional surface water hydraulic conditions, it is unlikely that facility operations have affected the pond.

2.4.3 Soil Conditions

Surface soils at and around the Hoover facility consist of both fill and native soils. The native soils consist predominantly of well drained silt and gravelly loams or somewhat poorly drained silty and clayey loams. Where the silty and clayey loams are present, these soils are subject to ponding and occasional flooding. Subsurface soils at and around the facility are characterized by glacial till deposits consisting of poorly sorted clay, silt, sand and gravel with lenses or layers of coarser grained sand and gravel (Williams 1991; Schaefer 1946). In the North Canton area, these deposits have been documented to range from 10 to 75 feet in thickness (Delong and White 1963). To the south and west, towards Nimishillen Creek near Canton, outwash valley fill deposits of predominantly well sorted, permeable sand and gravel are present at thicknesses ranging up to 250 feet (Williams 1991).

2.4.4 Bedrock Geology

In the Canton area, the uppermost layers of the near-surface bedrock formations are shale, sandstone, and coal (Delong and White 1963). Bedrock samples observed at the Hoover facility have been characterized as shale, although regional information suggests that coal deposits may exist beneath or near the southwest portion of the site. The top of bedrock at the site was generally encountered 12 to 18 feet below ground surface in soil borings completed near the Regulated Unit (CH2M HILL 1999a). Regionally, the top of the bedrock surface generally slopes to the southeast (Brockman and Vorbau 1996; Vorbau and Kriz 1996), although localized areas have been identified where the bedrock surface has been eroded and does not follow the regional slope. A comparison of site-specific and regional bedrock elevations suggests the Hoover facility is on a bedrock high (with the highest reported elevations near Parking Lot 6) off of which the bedrock surface slopes in all directions.

2.4.5 Onsite Groundwater Conditions

Most of the site-specific groundwater information was obtained from the Regulated Unit investigation (CH2M HILL 1999a). The water table there is encountered about 6 to 7 feet below ground, and the saturated thickness of the unconsolidated glacial deposits is typically less than 11 feet. Groundwater in the deposits is considered to be unconfined. Information obtained from borings that encountered bedrock indicate that the shale may act as a lower confining unit since it is often described as dry. Groundwater monitoring wells and piezometers screened across the sand and gravel unit at the site show a predominant groundwater gradient to the northwest between 0.01 and 0.02 ft/ft, but with a component of groundwater flow also to the south (Figure 2-4).

2.4.6 Regional Groundwater Use

The nearest known residential well is about ¼ mile west-northwest of the property boundary. The well log indicates that the well was drilled in 1960 to a depth of 30 feet and is screened in gravel. The well had a reported capacity of 15 gallons per minute (gpm). It is not known if the well is still in use. The nearest public water supply wells are about 0.7 miles north of the plant boundary. These 3 production wells (Applegrove Water Company) are 400 feet deep and screened in limestone. The wells have a combined capacity of 2.1 million gallons per day (mgd).

The City of North Canton public water supply is obtained from groundwater. The City's six public water supply wells are located approximately 0.8 miles west of the Hoover property boundary, and range from 86 to 397 feet deep. The wells have a combined capacity of 4 mgd. The wells are screened across outwash sand and gravel deposits, and shale and sandstone formations.

The Ohio EPA recently identified one additional groundwater user within a 1-mile radius of Plant 1—North Whipple Plaza, located about 0.6 mile west of the property boundary. Details regarding the type of water use, well capacity, well depth, and the geologic unit in which the well is completed are unavailable.

2.5 Previous Site Sampling Information

Environmental sampling data available for the Hoover site have focused on some general site conditions and the area around the Regulated Unit. The primary source of information regarding current environmental conditions at the facility is the recent Regulated Unit investigation work, documented in the Technical Memorandum: Regulated Unit Geoprobe Soil and Groundwater Sampling for The Hoover Company, North Canton, Ohio, May 26, 1999 (CH2M HILL 1999a). More limited sampling was performed around the Regulated Unit in 1988 (Floyd Brown Associates 1988). Data from the earlier investigation work were incorporated into the more recent report (CH2M HILL 1999a).

As part of that investigation work (CH2M HILL 1999a), soil samples were collected from 75 boring locations and groundwater samples were collected from 37 locations in and around the Regulated Unit. Twelve monitoring wells are within and surrounding the Regulated Unit and have been monitored for groundwater quality and groundwater levels. Seven piezometers were installed around the perimeter of the facility to better understand the site groundwater flow conditions. Groundwater quality samples have not been collected from the piezometers.

Soil and groundwater sampling results indicate that some of the constituents of interest stored at the Regulated Unit may have been released to the environment. The occurrence of phthalates, toluene, ethylbenzene, xylenes, chlorinated VOCs (principally tetrachloroethylene and its degradation products), and metals have been documented in soil and groundwater beneath and outside the boundaries of the Regulated Unit (CH2M HILL 1999a). It is not yet known if the metals or organic compounds are present at concentrations above facility-specific target screening or cleanup levels, which will be developed as part of this phase of the work.

3. Project Approach

This section provides an overview of the approach and scope of work that will be implemented to collect and analyze data for the perimeter investigation. The basis for selecting constituents on the TAL also is outlined in this section, and presented in further detail in Appendix A. Specifics regarding field sampling procedures and methods are presented in the associated Perimeter Investigation Sampling and Analysis Plan (CH2M HILL 1999b). Details regarding specific analytical methods and analytical quality control procedures are presented in the associated RCRA Facility Investigation Quality Assurance Project Plan (CH2M HILL 1999c).

3.1 Area of Investigation

The investigation will focus primarily on the facility property boundary and the areas most accessible to the public. The areas most accessible to the public are located in the northernmost area of the facility. These areas are currently or were formerly used as ball fields, baseball diamonds, and soccer or practice football fields. Data collection will be focused to meet the objectives described in Section 1.

3.2 Constituents of Interest and Potentially Affected Media

A TAL of the primary constituents of interest was developed based on known information regarding historic wastes and waste management practices. The list and supporting discussion presenting the basis for selection of constituents on the list is presented in detail in Appendix A. Analyses for the TAL constituents will be performed at most locations; however, analyses for the full list of compounds identified under RCRA Appendix IX (40 CFR 264), will be performed at roughly 20 percent of the locations to confirm that the TAL accurately reflects the primary constituents of interest.

Based on possible waste disposal activities, constituent migration, and exposure pathways, the media that will be sampled and analyzed during the investigation are soil and groundwater. At this time, surface water and sediment analyses are not proposed because current information suggests that there is not a potential human health exposure pathway from current potential sources via surface water or sediment exposure. Potential air issues will be assessed by standard methods for phase partitioning using the site-specific soil and groundwater chemical analyses, physical data, and published literature data on specific constituent partitioning properties. This approach is considered more representative of actual air concentrations potentially resulting from site-related constituents, because ambient air samples are typically influenced by multiple external sources (such as automobiles).

3.3 Data Needs Evaluation

To develop the sampling approach for this investigation, existing data were reviewed and data needs were identified. Additional data needs were identified to help better characterize and understand how the facility perimeter and targeted investigation areas in the North Yard may have been affected by past operations at the facility. The sampling approach was then developed to provide a better understanding of the following:

- Geologic, hydrogeologic, and geotechnical properties of saturated and unsaturated soils and bedrock
- The presence or absence of potentially site-related constituents in soil and groundwater at the facility perimeter
- If present, the concentrations and vertical and lateral distribution of site-related constituents in soil and groundwater at the facility perimeter
- The presence or absence of organic compound degradation indicator constituents in groundwater
- Concentrations of general groundwater parameters typically assessed for groundwater treatment systems evaluations
- The presence or absence of ecological receptors or potential ecological exposure pathways associated with onsite surface water and sediment

The Data Quality Objectives (DQO) Process (USEPA 1994) was used to design a sampling network which would address the additional data needs outlined above. The DQO process is a planning tool used to avoid collecting data that do not contribute to decisionmaking and to ensure that data of sufficient quantity and quality are collected so that informed decisions can be made. Based on the DQO process, the sampling network proposed for the perimeter investigation consists of the following (Figure 3-1):

- 80 perimeter borings (66 target and 14 contingency)
- 12 monitoring well locations (four of which are planned to be installed as shallow/deep well nests, for a total of 16 new wells to be installed at the perimeter)
- 25 surface soil sample locations in the current and former ball field areas in the northernmost part of the facility.

The actual number and locations of borings, monitoring wells, and surface soil sampling locations may vary depending upon field conditions and observations at the time of the sampling. However, a field ecological habitat and pathway evaluation will be performed and used as a basis to evaluate whether sample collection to assess ecological issues is warranted.

3.4 Boring Network Approach

The perimeter borings will be spaced about 120 feet apart. This spacing was selected after reviewing data collected during investigation of the Regulated Unit (CH2M HILL 1999a) and review of the SWMU listing and locations (CH2M HILL 1997). The extent of potentially site-related organic constituents detected in groundwater beneath the Regulated Unit was found to be in the range of 250 feet in diameter. This extent is a function of the constituents detected and subsurface conditions. If releases from other SWMUs between the Regulated Unit and the facility boundary have occurred, the extent of release may be less than the observed diameter of constituent detection distribution in groundwater beneath the Regulated Unit. The spacing of 120 feet for perimeter borings is somewhat conservative, with a 95 percent probability of detecting a constituent distribution that is 114 feet across (which is less than half the diameter of the known area of affected groundwater onsite).

In areas believed to be predominantly upgradient or to have an insignificant component of groundwater flow towards the area (along the east and south property boundaries), the target boring spacing was established at about 250 feet (consistent with the approximate diameter of the known area of affected groundwater onsite). In case evidence of a potential release is detected in soil or groundwater at the primary target locations set at 250-foot spacing, contingency boring locations were identified to better refine the dimensions of the potentially affected area that are consistent with the 120-foot target spacing (see Figure 3-1).

Borings planned for the ball field areas of the North Yard will roughly follow the 120-foot boring spacing target. The typical distance between immediately adjacent borings is about 120 feet (to maintain consistency with the overall perimeter spacing approach), but the locations are not spaced on a two-dimensional 120-foot grid. This coverage is intended to provide the data needed to assess surface soil conditions in North Yard areas generally accessible to the public without generating additional data that may provide limited additional value in understanding site conditions.

Table 3-1 presents an overview of the general analyses that will be performed and data collection needs that will be addressed at each boring. Details regarding specific sampling and analysis planned at each boring is presented in the Sampling and Analysis Plan.

3.5 Monitoring Well Network Approach

Monitoring well locations were selected based on the current understanding of the predominant groundwater flow direction (to the northwest, as determined from existing site data), and in areas where supplemental data can be used to better characterize and understand site-wide groundwater flow conditions. Several monitoring well locations currently identified are preliminary and will be finalized based on field observations noted during the perimeter boring investigation.

Four deep wells will be installed at the same locations as four of the shallow wells planned for the perimeter investigation. These co-located wells are typically referred to as "nested wells." One deep well is planned to be installed along each side of the facility perimeter (north at MW-15, south at MW-21, east at MW-23, and west at MW-17). This distribution of deep wells is intended to provide a site-wide understanding of shallow bedrock characteristics and variability. Nesting the deep wells with the shallow wells will facilitate characterization of the hydraulic properties of the deep and shallow groundwater systems and their interconnected relationship (if any). Groundwater from the shallow and deep wells will be sampled for Appendix IX constituents following well installation.

Select monitoring wells planned for this investigation effort were designed to enable implementation of an interim groundwater capture system if site-related constituents are detected in groundwater at the facility perimeter at concentrations above site-specific target cleanup levels. To provide this flexibility, four of the wells planned to be installed at presumed downgradient locations (MW-13, MW-16, MW-17, and MW-18) will be installed as 6-inch-diameter wells, which could later be converted to extraction wells if necessary. All other monitoring wells will be constructed as standard 2-inch-diameter monitoring wells. Additionally, groundwater analyses will be performed at roughly 10 percent of the locations for typical water quality parameters that are used to assess, select, and design groundwater treatment systems (treatability parameters).

3.6 Vertical Sampling Approach

Perimeter borings will be advanced to the top of bedrock. As described in Section 2.4.4, the top of the bedrock surface is expected to be encountered at depths of 12 to 20 feet, but perhaps significantly deeper in some areas. The shallow, surficial soils and groundwater within this zone are targeted as the primary media to be sampled because they are the most likely to have been affected by past site activities. As described in the previous section, four deep wells will be installed to characterize site-specific bedrock geologic, hydrogeologic, and groundwater quality properties, because this level of site-specific data currently does not exist. To obtain physical geologic and hydrogeologic site information, continuous geologic logs and field observations will be documented for each boring.

The following samples will be collected from each perimeter boring for chemical analyses:

- A surface soil sample (from the 0-to-2-foot interval)
- A subsurface soil sample, from a depth above the water table, targeted at the intervals 4 to 6 feet and 8 to 10 feet below ground. These samples may be eliminated if the water table is encountered within or above the target sampling interval.
- A groundwater sample at the water table.
- A groundwater sample at the top of the bedrock or at the maximum depth of the geoprobe.

At borings located in the current and former ball field areas in the North Yard, only a surface soil sample from the 0- to-2-foot interval will be collected. Subsurface soil and groundwater samples are not planned from these interior areas of the site because the primary focus of this phase of the RCRA Facility Investigation is on the perimeter and areas most accessible to the public. Further characterization of onsite areas will be performed as necessary during future investigation phases.

The North Yard and perimeter samples collected typically will be analyzed for constituents on the TAL (at roughly 80 percent of the locations). As described in Section 3.2, however, about 20 percent of the samples will be analyzed for full RCRA Appendix IX list constituents for confirmatory purposes, or to provide supplemental characterization data (for example, when the boring is in or near a potential SWMU boundary). At about 10 percent of the boring locations, additional groundwater volume will be collected and analyzed for a suite of either natural attenuation or treatability parameters, to provide supplemental characterization information.

The following additional samples will be collected from about 10 percent of the locations for other physical analyses:

- A subsurface soil sample from either the 2-to-4-foot or 6-to-8-foot interval.
- A subsurface saturated soil sample (at a depth of 12 to 14 feet below ground, below the water table).

The samples will be analyzed for total organic carbon content and other geotechnical parameters (grain size, bulk density, moisture content, and vertical hydraulic conductivity) to help assess physical and hydraulic properties of the saturated and unsaturated soils.

The total number and type of samples collected from a specific location will be based on the judgment and field characterization of the field geologist during the investigation. Depending on conditions observed during the field characterization effort, the following additional samples also may be collected:

- One additional subsurface soil sample per boring may be collected from the 2-to-4-foot or 6-to-8-foot interval, at the discretion of the field geologist, if field observations indicate the presence of suspected waste or other potentially site-related constituents in the subsurface above the water table.

- A groundwater sample at approximately the mid-point of the shallow saturated zone, if the saturated soil zone is greater than 20 feet in thickness and a permeable seam is encountered, based on field observations.

These samples will be analyzed for the same constituent suite as other samples of the same media within the same boring to provide additional subsurface environmental quality information, particularly if the boring location is within or near a potential SWMU location, if the possibility of subsurface site-related waste materials is identified, or if the saturated zone is particularly thick.

Table 3-2 summarizes of the general approach for selecting and analyzing samples from specific intervals within borings. Detailed intervals and analyses planned on a boring-specific basis is presented in the Sampling and Analysis Plan.

4. Scope of Work and Task Descriptions

This section is an overview of how the investigation and associated management tasks will be performed, how the data will be used to meet the project objectives and address issues identified in the problem statement, and how the findings will be communicated. Additional details can be found in the Perimeter Investigation Sampling and Analysis Plan, RCRA Facility Investigation Quality Assurance Project Plan, Voluntary Corrective Action Program Management Plan (CH2M HILL 1999d), Voluntary Corrective Action Health and Safety Plan (CH2M HILL 1999e), and Voluntary Corrective Action Data Management Plan(CH2M HILL 1999f).

4.1 Project Planning, Management, and Support

The project organization for the perimeter investigation is presented in Figure 4-1. Coordination and communication among CH2M HILL, Hoover, the perimeter investigation project team, the agencies, the public, and other stakeholders, will be conducted in accordance with procedures described in the Voluntary Corrective Action Program Management Plan. A project schedule is presented in Figure 4-2. Procedures for schedule control and change management are described in the Program Management Plan.

The quality control plan for the perimeter investigation addresses field quality control, analytical laboratory quality control, and quality control for deliverables and documents:

- Field quality control is addressed in the Sampling and Analysis Plan. The Sampling and Analysis Plan describes the Data Quality Objectives and sampling approach in detail and contains standard operating procedures for field sampling methods, sample packaging and tracking, sample quality control, and decontamination.
- Analytical quality control is addressed through the Quality Assurance Project Plan. The plan defines analytical team project organization, analytical methods, quantitation limits, quality control samples, and analytical data quality objectives. The Quality Assurance Project Plan also contains the laboratory quality control plan provided by Quanterra Environmental Services.
- Deliverables and document quality control will be addressed through guidelines to be provided to all authors that specify a review and scheduling process, and a document control process that identifies each document, its purpose, and anticipated review schedule. Hoover will receive (at a minimum) weekly updates of upcoming documents and their review schedules.

4.2 Data Acquisition

4.2.1 Field Mobilization and Field Boring Location Identification

Before beginning sample collection activities, proposed boring locations will be staked in the field. CH2M HILL representatives will work with local utility service companies and Hoover to clear locations for borings. Boring locations will be revised as necessary to avoid underground, overhead, or other obstructions identified. A field trailer and associated field equipment will be mobilized and set up before beginning boring and sample collection.

4.2.2 Boring Methods

Perimeter locations will be sampled using either a direct-push rig or hollow stem auger drilling rig. Samples will be collected from surface soil, subsurface soil and groundwater. Where surface soil only will be sampled (in the current and former ballfield areas of the North Yard), the samples will be collected using either a direct push rig or hand auger. Most sample locations (about 80 percent) will be analyzed for a TAL of constituents. About 20 percent of the locations will be targeted for full Appendix IX list analyses. Additional analyses will be performed on roughly 10 percent of samples from locations distributed evenly across the site to provide sitewide representative data in support of other data needs (i.e. evaluation of remedial technologies, natural attenuation potential or risk assessment). Detailed methods describing procedures that will be used to collect the data are described in the standard operating procedures, which are provided as an attachment to the Sampling and Analysis Plan. Field sampling activities will be performed following the site Health and Safety Plan.

4.2.3 Additional Perimeter Characterization Activities

The monitoring wells will be developed and hydraulic testing (water levels and slug tests) will be performed to characterize the physical properties of the saturated unit, and to assess the hydraulic connection between groundwater in the overburden and bedrock (if groundwater is found in the shallow bedrock).

Field data collection supporting ecological assessment activities also will be performed as part of the perimeter investigation.

Aerial base maps tied into surveyed ground control with 1-foot topographic contours onsite will be generated. All boring and monitoring well locations will be surveyed for both vertical and horizontal control.

4.3 Analytical Support and Data Quality Control Review

Samples will be submitted to Quanterra laboratory for analysis. CH2M HILL will coordinate laboratory services with Quanterra, which will be performed under separate contract to Hoover. Details regarding analytical methods and required practical quantitation limits are specified in the Quality Assurance Project Plan. Data packages received from Quanterra will be reviewed for compliance with the quality control specifications of the SAP and the Quality Assurance Project Plan.

Generally, the quality control review will consist of the following activities:

- Inventory the data package for completeness
- Check holding times for compliance with specified methods
- Review method, equipment, field, and trip blank results for potential contaminants and the level of contamination
- Review laboratory control sample result accuracy
- Review matrix spike/matrix spike duplicate result accuracy and precision, and

- Review field duplicate sample result precision.

The level of review performed will be enough to obtain confidence in the quality of the data. However, when errors are noted, a more detailed review will performed and data will be qualified as appropriate (as described in the Quality Assurance Project Plan).

4.4 Data Evaluation

Data will be summarized and imported into GIS/ARCview for display and interpretation. Data will be managed following procedures outlined in the Voluntary Corrective Action Data Management Plan. The display and interpretation of data will involve the comparison of individual analytical results to appropriate, conservative risk-based screening levels when evaluating whether further investigation or action is required (Figure 4-3). Further investigation may involve the following activities:

- Developing site-specific target screening levels for specific areas.
- Modeling fate and transport of specific constituents in groundwater or soil gas (based on partitioning and migration from soil and/or groundwater) to potential receptors.
- Identifying areas where further perimeter characterization may be needed to better understand environmental conditions along the facility perimeter.
- Assessing the need for offsite characterization, and, if found to be necessary, prioritizing and planning for offsite characterization efforts.
- Identifying the need for interim measures at the perimeter or at onsite areas to reduce potential risks.
- Prioritizing onsite areas for subsequent characterization efforts.
- Evaluating potential human health or ecological risks in specific areas.

Results of the perimeter investigation will provide information needed to better understand environmental conditions at the Hoover facility boundary and to achieve the objectives of this perimeter investigation. However, it is anticipated that completion of this phase of the RCRA Facility Investigation will not provide full characterization data to address all issues under the Voluntary Corrective Action Program. It is anticipated that additional data needs will be filled during future investigation and corrective action phases of the program.

In addition to generating a more complete conceptual understanding of facility perimeter conditions, it is anticipated that upon completion of this perimeter investigation, it will be possible to:

- Identify areas along the perimeter where further evaluation or investigation will be required because concentrations of constituents are greater than target screening levels.
- Identify lower-priority areas along the perimeter where additional investigation should not be required, because concentrations of constituents are below target screening levels.
- Assess whether investigations of offsite areas are or are not needed, and begin planning for those investigations needed.

- Assess whether implementation of interim corrective actions at the facility perimeter may be beneficial, and if so, identify potential alternatives and begin planning for implementation of those actions.
- Implement groundwater monitoring from the established monitoring well network for the duration of the corrective action program.

Additional potential issues that will not be fully addressed under this phase of work are expected to be:

- If constituent concentrations are detected over screening levels, it will not yet be possible to determine if there are potential risks to human health, groundwater or the environment. The perimeter investigation will identify the kinds of information needed to further evaluate potential risks to human health, groundwater or the environment.
- It will not be possible to determine whether or not areas at the Hoover facility will require corrective action in order to protect human health and groundwater. The perimeter investigation will identify the kinds of information needed to determine if action is required, and if so, the type of actions needed to be protective.

5. Deliverables

Field activities and findings will be summarized in a field technical memorandum (for file use only) and a Perimeter Field Investigation Report prepared for Hoover. As requested, quarterly status reports will be submitted to Hoover throughout duration of the investigation. The current schedule for completion of the Perimeter Field Investigation Report is targeted for the end of March, 2000 (Figure 4-2). Changes to the scope and schedule will be addressed following the process outlined for change management in the Program Management Plan.

6. References Cited

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Appendix A
Target Analyte List Constituent Selection

Target Analyte List Constituent Selection

Introduction

A list of chemical constituents to be analyzed in soil and groundwater samples was developed to achieve the objectives of the perimeter investigation. The starting point for specifying this target analyte list (TAL) was the list of RCRA Appendix IX constituents (Appendix IX to Title 40, Part 264). However, many of the constituents on the Appendix IX list have little likelihood of being found at the Hoover facility, and there would be limited value in analyzing all samples for all Appendix IX constituents. A subset (20 percent) of samples collected during the perimeter investigation will be analyzed for all Appendix IX constituents, to confirm that the TAL constituents were appropriately selected. However, for purposes of making decisions in a streamlined fashion, most samples will be analyzed for a focused list of target analytes drawn from the Appendix IX list. Selection of constituents for the focused list of target analytes was based on previous detection or analyses performed in soil or groundwater at the facility, and potential presence based on process history.

The purpose of this appendix is to document selection of this focused TAL and to present the approach supporting the constituents selected. It provides a description of the process for selecting constituents for the focused TAL, using the Appendix IX list as the initial baseline; and the constituents selected for the focused TAL.

Screening Process

A focused TAL was developed to streamline decision making associated with the perimeter investigation. The focused TAL was developed consistent with USEPA's guidance for developing sampling and analysis plan's (USEPA 1986). The process used to screen Appendix IX constituents to obtain the focused TAL is presented in Figure A-1. The full RCRA Appendix IX list and screening process is documented in Attachment 1. The focused TAL was drawn from the Appendix IX list of constituents. A screening process was used to determine if a constituent was detected or analyzed during previous investigations, identified in the November 1997 inventory report, The Amended Closure Plan for the Regulated Unit, or potentially associated with wastestreams identified in the November 1997 inventory report. The focused TAL for use in the perimeter investigation is presented in Table A-1. Additional chemicals may be included later for investigations of specific onsite units, based on information in the November 1997 inventory report, or information developed during the perimeter investigation.

PCB-containing materials were managed at Unit S25, PCB Waste Storage Area and one electrical transformer potentially containing PCBs (Unit A9: Former PCB Transformers), located indoors within a concrete containment unit, has been reported at the facility. While PCBs may have been present at the facility, they are not included on the TAL for purposes of the Perimeter Investigation. The occurrence of these constituents is limited at the facility.

PCBs have low mobility in soil, and therefore are anticipated to have little likelihood of being found at the facility perimeter. While these constituents would not be monitored on the TAL list, they will be analyzed along with other Appendix IX constituents in the 20 percent of total samples collected during the Perimeter Investigation.

FIGURE A-1
TAL Selection Process

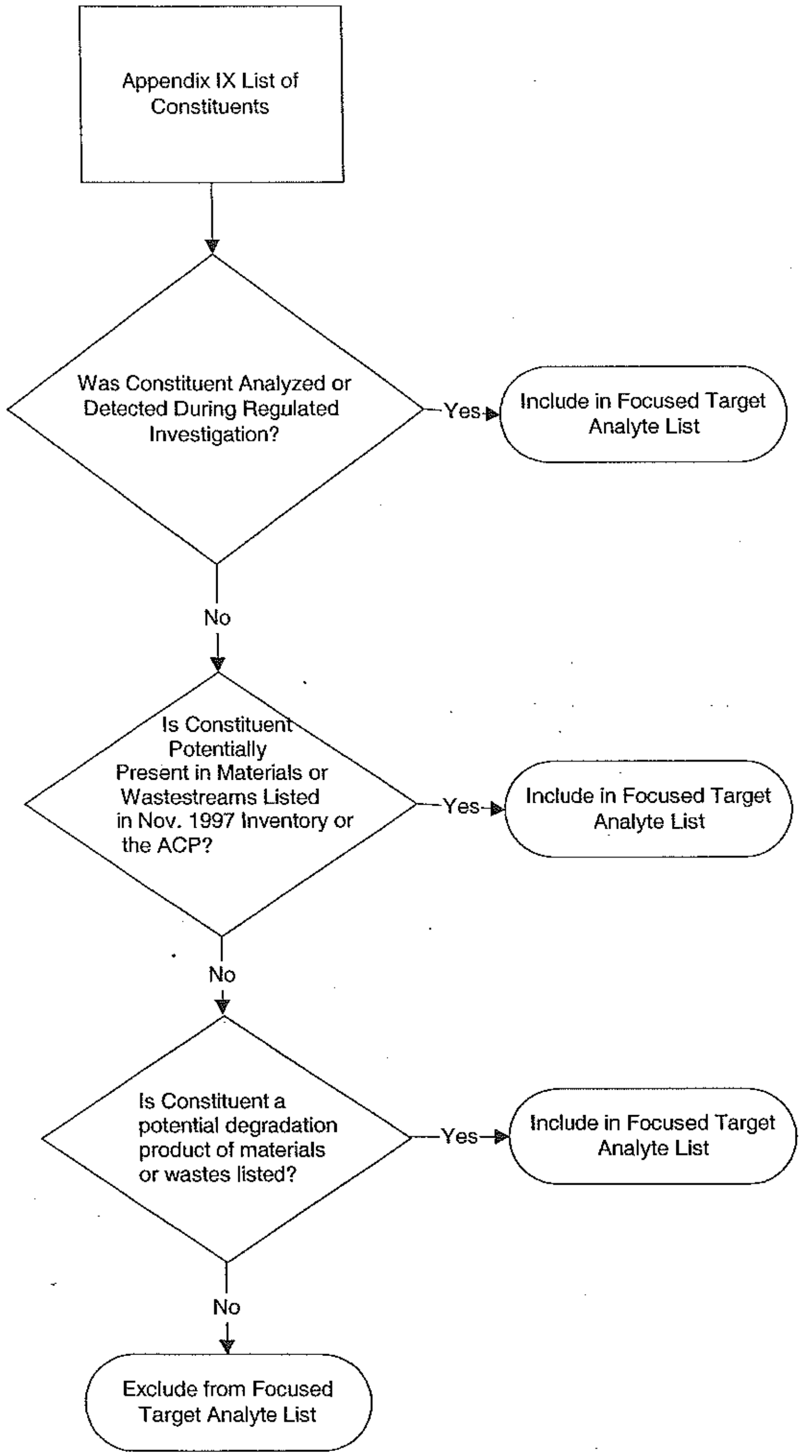

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TABLE A-1
Focused Target Analyte List for Perimeter Investigation

Chemical	Rationale for Inclusion on Focused TAL
Semivolatile Organic Compounds (SVOCs)	
Acenaphthene	Potentially associated with wastestreams identified at facility
Acenaphthylene	Potentially associated with wastestreams identified at facility
Anthracene	Potentially associated with wastestreams identified at facility
Benzo(a)anthracene	Potentially associated with wastestreams identified at facility
Benzo(a)pyrene	Potentially associated with wastestreams identified at facility
Benzo(b)fluoranthene	Potentially associated with wastestreams identified at facility
Benzo(g,h)perylene	Potentially associated with wastestreams identified at facility
Benzo(k)fluoranthene	Potentially associated with wastestreams identified at facility
Bis(2-ethylhexyl)phthalate	Detected during previous investigations
Butyl benzyl phthalate	Detected during previous investigations
Chrysene	Potentially associated with wastestreams identified at facility
Dibenz(a,h)anthracene	Potentially associated with wastestreams identified at facility
Diethyl phthalate	Analyzed during previous investigations
Dimethyl phthalate	Analyzed during previous investigations
Di-n-butyl phthalate	Analyzed during previous investigations
Di-n-octyl phthalate	Analyzed during previous investigations
Fluoranthene	Potentially associated with wastestreams identified at facility
Fluorene	Potentially associated with wastestreams identified at facility
Indeno(1,2,3-cd)pyrene	Potentially associated with wastestreams identified at facility
Naphthalene	Potentially associated with wastestreams identified at facility
Phenanthrene	Potentially associated with wastestreams identified at facility
Pyrene	Potentially associated with wastestreams identified at facility

TABLE A-1
Focused Target Analyte List for Perimeter Investigation

Chemical	Rationale for Inclusion on Focused TAL
Pyridine	Potentially associated with wastestreams identified at facility
Volatile Organic Compounds (VOCs)	
1,1,1-Trichloroethane	Detected during previous investigations
1,1,2-Trichloroethane	Potentially associated with wastestreams identified at facility
1,1-Dichloroethane	Detected during previous investigations
1,1-Dichloroethylene	Detected during previous investigations
1,2-Dichlorobenzene	Potentially associated with wastestreams identified at facility
1,2-Dichloroethane	Analyzed during previous investigations
4-Methyl-2-pentanone	Analyzed during previous investigations
Benzene	Analyzed during previous investigations
Butyl alcohol	Potentially associated with wastestreams identified at facility
Carbon disulfide	Potentially associated with wastestreams identified at facility
Carbon tetrachloride	Potentially associated with wastestreams identified at facility
Chlorobenzene	Potentially associated with wastestreams identified at facility
Chloroform	Potentially associated with wastestreams identified at facility
cis-1,2-Dichloroethylene	Detected during previous investigations
Dichlorodifluoromethane	Potentially associated with wastestreams identified at facility
Ethylbenzene	Detected during previous investigations
Isobutyl alcohol	Potentially associated with wastestreams identified at facility
Methyl ethyl ketone	Detected during previous investigations
Methylene chloride	Potentially associated with wastestreams identified at facility
Tetrachloroethylene	Detected during previous investigations
Toluene	Detected during previous investigations
trans-1,2-Dichloroethylene	Potentially associated with wastestreams identified at facility
Trichloroethylene	Detected during previous investigations
Trichlorofluoromethane	Potentially associated with wastestreams identified at facility
Vinyl chloride	Potential degradation product of chlorinated solvents
Xylenes	Detected during previous investigations

Table A-1

Focused Target Analyte List for Perimeter Investigation

Chemical	Rationale for Inclusion on Focused TAL
Metals (and Inorganics)	
Barium	Detected during previous investigations
Cadmium	Detected during previous investigations
Chromium	Detected during previous investigations
Copper	Detected during previous investigations
Cyanide	Potentially associated with wastestreams identified at facility
Lead	Detected during previous investigations
Mercury	Potentially associated with wastestreams identified at facility
Nickel	Detected during previous investigations
Titanium	Potentially associated with wastestreams identified at facility
Vanadium	Potentially associated with wastestreams identified at facility
Zinc	Detected during previous investigations

Attachment 1

Selection of Chemicals for Focused Target Analyte List

Chemical	CAS Number	Identification of Constituents of Interest: Previously Analyzed at Hoover	Concentration Range in Soil (mg/kg)	Concentration Range (totals) in Groundwater (mg/L)	Potentially Present in Waste or Material Managed at Hoover	Not Anticipated to be Present at Hoover	Constituent to be Included on Focused TAL for Perimeter Investigation? Yes	No	Rationale for Inclusion on Focused TAL
Volatiles									
1,1,1,2-Tetrachloroethane	630-20-6					x		x	
1,1,1-Trichloroethane	71-55-6	x	0.0052–37	0.011–8.3			x		Detected during previous investigations
1,1,2,2-Tetrachloroethane	79-34-5					x		x	
1,1,2-Trichloroethane	79-00-5				x		x		Potentially associated with wastestreams identified at facility
1,1-Dichloroethane	75-34-3	x	0.0058–1.6	0.0031–0.67			x		Detected during previous investigations
1,1-Dichloroethylene	75-34-4	x	0.0061–2	0.0013–1.3			x		Detected during previous investigations
1,2,3-Trichloropropane	96-18-4					x		x	
1,2-Dibromoethane	106-93-4					x		x	
1,2-Dichlorobenzene	95-50-1				x		x		Potentially associated with wastestreams identified at facility
1,2-Dichloroethane	107-06-2	x	ND	ND			x		Analyzed during previous investigations
1,2-Dichloropropane	78-87-5					x		x	
1,3-Dichlorobenzene	541-73-1					x		x	
1,4-Dichlorobenzene	106-46-7					x		x	
2-Chloroethyl vinyl ether	110-75-8					x		x	
2-Hexanone	591-78-6					x		x	
3,3'-Dichlorobenzidine	91-94-1					x		x	
4-Methyl-2-pentanone	108-10-1	x	ND	ND			x		Analyzed during previous investigations
Acetone	67-64-1					x		x	
Acetonitrile	75-05-8					x		x	
Acrolein	107-02-8					x		x	
Acrylonitrile	107-13-1					x		x	
Allyl chloride	107-05-1					x		x	
Benzene	71-43-2	x	ND	ND			x		Analyzed during previous investigations
Bromoacetone	598-31-2					x		x	
Bromodichloromethane	75-27-4					x		x	
Bromoform	72-25-2					x		x	
Butyl alcohol	78-92-2				x		x		Potentially associated with wastestreams identified at facility
Carbon disulfide	75-15-0				x		x		Potentially associated with wastestreams identified at facility
Carbon tetrachloride	56-23-5				x		x		Potentially associated with wastestreams identified at facility
Chlorobenzene	108-90-7				x		x		Potentially associated with wastestreams identified at facility
Chloroethane	75-00-3					x		x	
Chloroform	67-66-3				x		x		Potentially associated with wastestreams identified at facility
Chloroprene	126-99-8					x		x	
cis-1,2-Dichloroethylene	156-59-2	x	0.0025–31	0.0016–31			x		Detected during previous investigations
cis-1,3-Dichloropropene	10061-01-5					x		x	

ATTACHM A-1
Selection of Chemicals for Focused Target Analyte List

Chemical	CAS Number	Identification of Constituents of Interest: Previously Analyzed at Hoover	Concentration Range in Soil (mg/kg)	Concentration Range (totals) in Groundwater (mg/L)	Potentially Present in Waste or Material Managed at Hoover	Not Anticipated to be Present at Hoover	Constituent to be Included on Focused TAL for Perimeter Investigation?: Yes	No	Rationale for Inclusion on Focused TAL
Dibromochloromethane	124-48-1					x		x	
Dichlorodifluoromethane	75-71-8					x	x		Potentially associated with wastestreams identified at facility
Ethylbenzene	100-41-4	x	0.014–140	0.35					Detected during previous investigations
Isobutyl alcohol	78-83-1				x		x		Potentially associated with wastestreams identified at facility
Methacrylonitrile	126-98-7					x		x	
Methyl bromide	74-83-9					x		x	
Methyl chloride	74-87-3					x		x	
Methyl ethyl ketone	78-93-3	x	0.023	ND			x		Detected during previous investigations
Methyl iodide	74-88-4					x		x	
Methyl methacrylate	80-62-6					x		x	
Methylene bromide	74-95-3					x		x	
Methylene chloride	75-09-2				x		x		Potentially associated with wastestreams identified at facility
Styrene	100-42-5					x		x	
Tetrachloroethylene	127-18-4	x	0.005–540	0.0026–200			x		Detected during previous investigations
Toluene	108-88-3	x	0.005–14	0.0015–0.0061			x		Detected during previous investigations
trans-1,2-Dichloroethylene	156-60-5	x	ND	ND			x		Potentially associated with wastestreams identified at facility
trans-1,3-Dichloropropene	10061-02-6					x		x	
trans-1,4-Dichloro-2-butene	110-57-6					x		x	
Trichloroethylene	79-01-6	x	0.0052–89	0.0011–1.4			x		Detected during previous investigations
Trichlorofluoromethane	75-69-4				x		x		Potentially associated with wastestreams identified at facility
Vinyl acetate	108-05-4					x		x	
Vinyl chloride	75-01-4	x	0.38–7	ND			x		Potential degradation product of chlorinated solvents
Xylene (total)	1330-20-7	x	0.0051–280	0.22–0.26			x		Detected during previous investigations
Metals									
Antimony	7440-36-0					x		x	
Arsenic	7440-38-2					x		x	
Barium	7440-39-3	x	0.5–1,120	0.26–71			x		Detected during previous investigations
Beryllium	7440-41-7					x		x	
Cadmium	7440-43-9	x	0.078–390	0.0024–2			x		Detected during previous investigations
Chromium	7440-47-3	x	0.2–660	0.039–10.7			x		Detected during previous investigations
Cobalt	7440-48-4					x		x	
Copper	7440-50-8	x	6.2–38,400	0.0254–53.8			x		Detected during previous investigations
Cyanide	57-12-5				x		x		Potentially associated with wastestreams identified at facility
Lead	7439-92-1	x	3–1,200	0.0034–15.4			x		Detected during previous investigations
Mercury	7439-97-6				x		x		Potentially associated with wastestreams identified at facility
Nickel	7440-02-0	x	6–380	0.044–9.6			x		Detected during previous investigations

ATTACHM A-1
Selection of Chemicals for Focused Target Analyte List

Chemical	CAS Number	Identification of Constituents of Interest: Previously Analyzed at Hoover	Concentration Range in Soil (mg/kg)	Concentration Range (totals) in Groundwater (mg/L)	Potentially Present in Waste or Material Managed at Hoover	Not Anticipated to be Present at Hoover	Constituent to be Included on Focused TAL for Perimeter Investigation? Yes	No	Rationale for Inclusion on Focused TAL
Selenium	7782-49-2					x		x	
Silver	7440-22-4					x		x	
Sulfide	18496-25-8					x		x	
Thallium	7440-28-0					x		x	
Tin	7440-31-5					x		x	
Titanium	7440-32-6				x		x		Potentially associated with wastestreams identified at facility
Vanadium	7440-62-2				x		x		Potentially associated with wastestreams identified at facility
Zinc	7440-66-6	x	14–16,500	0.027–82.2			x		Detected during previous investigations
Pesticides									
2,4,5-T	93-76-5					x		x	
2,4-D	94-75-7					x		x	
4,4'-DDD	72-54-8					x		x	
4,4'-DDE	72-55-9					x		x	
4,4'-DDT	50-29-3					x		x	
Aldrin	309-00-2					x		x	
alpha BHC	319-84-6					x		x	
beta BHC	319-85-7					x		x	
Chlordane	57-74-9					x		x	
delta BHC	319-86-8					x		x	
Dieldrin	60-57-1					x		x	
Dinoseb	88-85-7					x		x	
Endosulfan I	969-98-9					x		x	
Endosulfan II	33213-65-9					x		x	
Endosulfan sulfate	1031-07-8					x		x	
Endrin	72-20-8					x		x	
Endrin aldehyde	7421-93-4					x		x	
gamma BHC	58-89-9					x		x	
Heptachlor	76-44-8					x		x	
Heptachlor epoxide	1024-57-3					x		x	
Methoxychlor	72-43-5					x		x	
Polychlorinated biphenyls	1336-36-3				x			x	Potential for migration to the perimeter is likely to be small
Silvex	93-72-1					x		x	
Toxaphene	8001-35-2					x		x	
Semi-Volatiles									
1,2,3,4-Diepoxybutane	1464-53-5					x		x	
1,2,4,5-Tetrachlorobenzene	95-94-3					x		x	

Selection of Chemicals for Focused Target Analyte List

		Identification of Constituents of Interest					Constituent to be Included on Focused TAL for Perimeter Investigation?		Rationale for Inclusion on Focused TAL
Chemical	CAS Number	Previously Analyzed at Hoover	Concentration Range in Soil (mg/kg)	Concentration Range (totals) in Groundwater (mg/L)	Potentially Present in Waste or Material Managed at Hoover	Not Anticipated to be Present at Hoover	Yes	No	
1,2,4-Trichlorobenzene	120-82-1					x		x	
1,2-Dibromo-3-chloropropane	96-12-8					x		x	
1,3-Dichloro-2-propanol	96-23-1					x		x	
1,4-Dioxane	123-91-1					x		x	
1,4-Naphthoquinone	130-15-4					x		x	
1-Naphthylamine	134-32-7					x		x	
2,3,4,6-Tetrachlorphenol	58-90-2					x		x	
2,3,7,8-TCDD	1746-01-6					x		x	
2,4,5-Trichlorophenol	95-95-4					x		x	
2,4,6-Trichlorophenol	88-06-2					x		x	
2,4-Dichlorophenol	120-83-2					x		x	
2,4-Dimethylphenol	105-67-9					x		x	
2,4-Dinitrophenol	51-28-5					x		x	
2,4-Dinitrotoluene	121-14-2					x		x	
2,6-Dichlorophenol	87-65-0					x		x	
2,6-Dinitroluene	606-20-2					x		x	
2-Acetylaminofluorene	53-96-3					x		x	
2-Chloronaphthalene	91-58-7					x		x	
2-Chlorophenol	95-57-8					x		x	
2-Methylnaphthalene	91-57-6					x		x	
2-Naphthylamine	91-59-8					x		x	
2-Picoline	109-06-8					x		x	
3,3'-Dimethylbenzidine	119-93-7					x		x	
3-Chloropropionitrile	542-76-7					x		x	
3-Methylcholanthrene	56-49-5					x		x	
4,6-Dinitro-o-cresol	534-52-1					x		x	
4-Aminobiphenyl	92-67-1					x		x	
4-Bromophenyl phenyl ether	101-55-3					x		x	
4-Chlorophenyl phenyl ether	7005-72-3					x		x	
4-Nitroquinoline 1-oxide	56-57-5					x		x	
5-Nitro-o-toluidine	99-55-8					x		x	
7,12-Dimethylbenz(a)anthracene	57-97-6					x		x	
Acenaphthene	83-32-9				x		x		Potentially associated with wastestreams identified at facility
Acenaphthylene	208-96-8				x		x		Potentially associated with wastestreams identified at facility
Acetophenone	98-86-2					x		x	
Allyl alcohol	107-18-6					x		x	

ATTACHM. A-1
Selection of Chemicals for Focused Target Analyte List

Chemical	CAS Number	Identification of Constituents of Interest: Previously Analyzed at Hoover	Concentration Range in Soil (mg/kg)	Concentration Range (totals) in Groundwater (mg/L)	Potentially Present in Waste or Material Managed at Hoover	Not Anticipated to be Present at Hoover	Constituent to be Included on Focused TAL for Perimeter Investigation? Yes	No	Rationale for Inclusion on Focused TAL
alpha,alpha-Dimethylphenethyla	122-09-8					x		x	
Aniline	62-53-3					x		x	
Anthracene	120-12-7				x		x		Potentially associated with wastestreams identified at facility
Aramite	140-57-8					x		x	
Aroclor-1016	12674-11-2				x			x	Potential for migration to the perimeter is likely to be small
Aroclor-1221	11104-28-2				x			x	Potential for migration to the perimeter is likely to be small
Aroclor-1232	11141-16-5				x			x	Potential for migration to the perimeter is likely to be small
Aroclor-1242	53469-21-9				x			x	Potential for migration to the perimeter is likely to be small
Aroclor-1248	12672-6				x			x	Potential for migration to the perimeter is likely to be small
Aroclor-1254	11097-69-1				x			x	Potential for migration to the perimeter is likely to be small
Aroclor-1260	11096-82-5				x			x	Potential for migration to the perimeter is likely to be small
Benzo(a)anthracene	56-55-3				x		x		Potentially associated with wastestreams identified at facility
Benzo(a)pyrene	50-32-8				x		x		Potentially associated with wastestreams identified at facility
Benzo(b)fluoranthene	205-99-2				x		x		Potentially associated with wastestreams identified at facility
Benzo(g,h)perylene	191-24-2				x		x		Potentially associated with wastestreams identified at facility
Benzo(k)fluoranthene	207-08-9				x		x		Potentially associated with wastestreams identified at facility
Benzyl alcohol	100-51-6					x		x	
Benzyl chloride	100-44-7					x		x	
Bis(2-chloro-1-methyl)ether	108-60-1					x		x	
Bis(2-chloroethoxy)methane	111-91-1					x		x	
Bis(2-chloroethyl)ether	111-44-4					x		x	
Bis(2-ethylhexyl)phthalate	117-81-7	x	0.3–1,900	0.0061–0.5			x		Detected during previous investigations
b-Propiolactone	57-57-8					x		x	
Butyl benzyl phthalate	85-68-7	x	0.05–320	ND			x		Detected during previous investigations
Chlorobenzilate	510-15-6					x		x	
Chrysene	218-01-9				x		x		Potentially associated with wastestreams identified at facility
Diallate	2303-16-4					x		x	
Dibenz(a,h)anthracene	53-70-3				x		x		Potentially associated with wastestreams identified at facility
Dibenzofuran	132-64-9					x		x	
Diethyl phthalate	84-66-2	x	0.05–20	ND			x		Analyzed during previous investigations
Dimethoate	60-51-5					x		x	
Dimethyl phthalate	131-11-3	x	0.074–720	ND			x		Analyzed during previous investigations
Di-n-butyl phthalate	84-74-2	x	0.06–120	ND			x		Analyzed during previous investigations
Di-n-octyl phthalate	117-84-0	x	6.5–4,500	ND			x		Analyzed during previous investigations
Diphenylamine	122-39-4					x		x	
Disulfoton	298-04-4					x		x	

ATTACHM. A-1
Selection of Chemicals for Focused Target Analyte List

Chemical	CAS Number	Identification of Constituents of Interest: Previously Analyzed at Hoover	Concentration Range in Soil (mg/kg)	Concentration Range (totals) in Groundwater (mg/L)	Potentially Present in Waste or Material Managed at Hoover	Not Anticipated to be Present at Hoover	Constituent to be Included on Focused TAL for Perimeter Investigation? Yes	No	Rationale for Inclusion on Focused TAL
Epichlorohydrin	106-89-8					x		x	
Ethanol	64-17-5					x		x	
Ethyl methacrylate	97-63-2					x		x	
Ethyl methanesulfonate	62-50-0					x		x	
Ethylene oxide	75-21-8					x		x	
Famphur	52-85-7					x		x	
Fluoranthene	206-44-0				x		x		Potentially associated with wastestreams identified at facility
Fluorene	86-73-7				x		x		Potentially associated with wastestreams identified at facility
Hexachlorobenzene	118-74-1					x		x	
Hexachlorobutadiene	87-68-3					x		x	
Hexachlorocyclopentadiene	77-47-4					x		x	
Hexachloroethane	67-72-1					x		x	
Hexachlorophene	70-30-4					x		x	
Hexachloropropene	1888-71-7					x		x	
Indeno(1,2,3-cd)pyrene	193-39-5				x		x		Potentially associated with wastestreams identified at facility
Iodomethane	74-88-4					x		x	
Isodrin	465-73-6					x		x	
Isophorone	78-59-1					x		x	
Isosafrole	120-58-1					x		x	
Kepone	143-50-0					x		x	
Malononitrile	109-77-3					x		x	
m-Cresol	108-39-4					x		x	
m-Dinitrobenzene	99-65-0					x		x	
Methapyrilene	91-80-5					x		x	
Methyl methanesulfate	66-27-3					x		x	
Methyl parathion	298-00-0					x		x	
m-Nitroaniline	99-09-2					x		x	
Naphthalene	91-20-3				x		x		Potentially associated with wastestreams identified at facility
Nitrobenzene	98-95-3					x		x	
N-Nitrosodiethylamine	55-18-5					x		x	
N-Nitrosodi-n-butylamine	924-16-3					x		x	
N-Nitrosodiphenylamine	86-30-6					x		x	
N-Nitrosodipropylamine	621-64-7					x		x	
N-Nitrosomethylethylamine	10595-95-6					x		x	
N-Nitrosomorphine	59-89-2					x		x	
N-Nitrosopyrrolidine	930-55-2					x		x	

Selection of Chemicals for Focused Target Analyte List

Chemical	CAS Number	Identification of Constituents of Interest: Previously Analyzed at Hoover	Concentration Range in Soil (mg/kg)	Concentration Range (totals) in Groundwater (mg/L)	Potentially Present in Waste or Material Managed at Hoover	Not Anticipated to be Present at Hoover	Constituent to be Included on Focused TAL for Perimeter Investigation? Yes	No	Rationale for Inclusion on Focused TAL
O,O,O-Triethyl phosphorothioate	126-68-1					x		x	
O,O-Diethyl O-2-pyrazinyl phosp	297-97-2					x		x	
o-Cresol	95-48-7					x		x	
o-Nitroaniline	88-74-4					x		x	
o-Nitrophenol	88-75-5					x		x	
o-Toluidine	95-53-4					x		x	
p-(Dimethylamino)azobenzene	60-11-7					x		x	
Parathion	56-38-2					x		x	
p-Chloroaniline	106-47-8					x		x	
p-Chloro-m-cresol	59-50-7					x		x	
p-Cresol	106-44-5					x		x	
Pentachlorobenzene	608-93-5					x		x	
Pentachloroethane	76-01-7					x		x	
Pentachloronitrobenzene	82-68-8					x		x	
Pentachlorophenol	87-86-5					x		x	
Phenacetin	62-44-2					x		x	
Phenanthrene	85-01-8				x		x		Potentially associated with wastestreams identified at facility
Phenol	108-95-2					x		x	
Phorate	298-02-2					x		x	
p-Nitroaniline	100-01-6					x		x	
p-Nitrophenol	100-02-7					x		x	
Polychlorinated dibenzofurans	PCDF					x		x	
Polychlorinated dibenzo-p-dioxin	PCDD					x		x	
p-Phenylenediamine	106-50-3					x		x	
Pronamide	23950-58-5					x		x	
Propargyl alcohol	107-19-7					x		x	
Propionitrile	107-12-0					x		x	
Pyrene	129-00-0				x		x		Potentially associated with wastestreams identified at facility
Pyridine	110-86-1				x		x		Potentially associated with wastestreams identified at facility
Safrole	94-59-7					x		x	
sym-Trinitrobenzene	99-35-4					x		x	
Tetraethyl dithiopyrophosphate	3689-24-5					x		x	

TABLE 3-1

Summary of Perimeter Boring Data Collection Activities and Approach

Perimeter Investigation

The Hoover Company, Plant No. 1, North Canton, OH

	Media and Selected Analyses[1,2,3]								Perimeter Investigation Objectives and Associated Data Collection Activities						
	Soil				Groundwater				Characterize Perimeter and Assess Migration or Exposure Potential			Provide data to support evaluation or selection of perimeter or source management measures			Prioritize or Focus Subsequent Investigations
Sample Location ID	Appendix IX Constituents	Focused Target Analyte List[4]	Geotechnical Parameters	Total Organic Carbon	Appendix IX Constituents	Focused Target Analyte List	Treatability Parameters	Natural Attenuation Parameters	Characterize vertical and lateral extent of constituents in soil	Characterize vertical and lateral extent of constituents in groundwater	Identify constituent presence or absence in surface soil in public access areas (including North Yard ballfield areas)	Identify organic compound degradation indicators in groundwater	Characterize geologic, hydrogeologic, and/or geotechnical properties	Identify groundwater parameter concentrations affecting selection/design of treatment systems	Characterize vertical and lateral extent of compounds in soil and groundwater near SWMUs
107	X				X				X	X	X				X
108	X				X		X		X	X	X			X	X
109/ MW- 13S		X	X	X		X		X	X	X	X	X	X		
110	X				X				X	X	X				X
111/ MW- 14S	X				X				X	X	X				X
112		X				X			X	X	X				
113		X				X			X	X	X				
114		X				X			X	X	X				
115/ MW- 15S&D		X	X	X		X		X	X	X	X	X	X		
116		X				X	X		X	X	X			X	
117	X				X				X	X	X				
118		X				X			X	X	X				
119		X				X			X	X	X				
120		X				X	X		X	X	X			X	
121		X	X	X		X		X	X	X	X	X	X		
122	X				X				X	X	X				
123		X				X			X	X	X				
124		X				X			X	X	X				
125		X				X	X		X	X	X			X	
126		X	X	X		X		X	X	X	X	X	X		
127	X				X				X	X	X				X
128	X				X				X	X	X				X
129		X	X	X		X		X	X	X	X	X	X		
130		X				X	X		X	X	X			X	
131	X				X				X	X	X				X
132		X				X			X	X	X				
133	X				X				X	X	X				X
134		X				X			X	X	X				
135	X				X				X	X	X				X
136		X	X	X		X		X	X	X	X	X	X		
137		X				X	X		X	X	X			X	
138		X				X			X	X	X				
139		X				X			X	X	X				

TABLE 3-1

Summary of Perimeter Boring Data Collection Activities and Approach

Perimeter Investigation

The Hoover Company, Plant No. 1, North Canton, OH

	Media and Selected Analyses[1,2,3]								Perimeter Investigation Objectives and Associated Data Collection Activities						
	Soil				Groundwater				Characterize Perimeter and Assess Migration or Exposure Potential			Provide data to support evaluation or selection of perimeter or source management measures			Prioritize or Focus Subsequent Investigations
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140		X				X			X	X	X				
141	X				X				X	X	X				
142		X				X			X	X	X				
143		X				X			X	X	X				
144		X				X			X	X	X				
145	X			X	X				X	X	X		X		X
146		X				X			X	X	X				
147		X				X			X	X	X				
148		X				X			X	X	X				
149		X				X			X	X	X				
150	X				X				X	X	X				
151/ MW- 21S&D		X				X			X	X	X				
152		X				X			X	X	X				
153		X				X			X	X	X				
154	X			X	X				X	X	X		X		
155		X				X			X	X	X				
156		X				X	X		X	X	X			X	
157		X	X	X		X		X	X	X	X	X	X		
158		X				X			X	X	X				
159/ MW- 22S	X				X				X	X	X				
160		X				X			X	X	X				
161	X				X				X	X	X				X
162		X				X			X	X	X				
163		X				X			X	X	X				
164		X				X			X	X	X				
165	X				X				X	X	X				X
166		X				X			X	X	X				
167		X				X			X	X	X				
168	X				X				X	X	X				
169/ MW-23S&D		X	X	X		X		X	X	X	X	X	X		
170		X				X	X		X	X	X			X	
171		X				X			X	X	X				
172	X			X	X				X	X	X				

TABLE 3-1

Summary of Perimeter Boring Data Collection Activities and Approach

Perimeter Investigation

The Hoover Company, Plant No. 1, North Canton, OH

	Media and Selected Analyses[1,2,3]								Perimeter Investigation Objectives and Associated Data Collection Activities						
	Soil				Groundwater				Characterize Perimeter and Assess Migration or Exposure Potential			Provide data to support evaluation or selection of perimeter or source management measures			Prioritize or Focus Subsequent Investigations
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173		X				X			X	X	X				
174/ MW-24S		X				X			X	X	X				
175		X				X			X	X	X				
176		X				X			X	X	X				
177	X				X				X	X	X				X
178		X				X			X	X	X				
179	X				X				X	X	X				X
180		X				X			X	X	X				
181		X				X			X	X	X				
182		X				X			X	X	X				
183		X				X			X	X	X				
184		X				X			X	X	X				
185		X				X			X	X	X				
186		X				X			X	X	X				
187		X				X			X	X	X				
188		X				X	X		X	X	X			X	
189		X				X			X	X	X				
190		X				X			X	X	X				
191		X				X			X	X	X				
192		X				X			X	X	X				
193		X				X			X	X	X				
194		X									X				
195	X										X				
196		X									X				
197		X									X				
198		X									X				
199		X									X				
200		X									X				
201	X										X				
202		X									X				
203		X									X				
204		X									X				
205	X										X				

TABLE 3-1

Summary of Perimeter Boring Data Collection Activities and Approach

Perimeter Investigation

The Hoover Company, Plant No. 1, North Canton, OH

	Media and Selected Analyses[1,2,3]								Perimeter Investigation Objectives and Associated Data Collection Activities						
	Soil				Groundwater				Characterize Perimeter and Assess Migration or Exposure Potential			Provide data to support evaluation or selection of perimeter or source management measures			Prioritize or Focus Subsequent Investigations
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206		X									X				
207		X									X				
208		X									X				
209		X									X				
210		X									X				
211		X									X				
212		X									X				
213		X									X				
214		X									X				
215		X									X				
216		X									X				
217	X										X				
218		X									X				
MW- 16S	To be sampled during the Perimeter Investigation post-drilling phase along with MW-13S, -14S, -15S&D, -22S, -23S&D, and -24S for Appendix IX constituents.														
MW- 17S&D															
MW- 18S															
MW- 19S															
MW- 20S															
MW- 21S&D															

Notes:

[1]The actual number and locations of borings, monitoring wells, and surface soil sampling locations may vary depending upon the field conditions and observations at the time of sampling.

[2]These analytical suites apply to the soil and groundwater samples collected during the drilling phase of the Perimeter Investigation field-work. The completed monitoring wells will be sampled following the drilling-phase and all of the samples collected during the Perimeter Investigation post-drilling phase will be analyzed for Appendix IX constituents.

[3]Reference the Perimeter Investigation Sampling and Analysis Plan (CH2M HILL 1999b) and Perimeter Investigation Quality Assurance Project Plan (CH2M HILL 1999c) for additional information regarding specific methodologies and procedures.

[4]Reference Appendix A (Target Analyte List Constituent Selection) to this work plan.

TABLE 3-2
Vertical Interval Sampling Approach
Perimeter Investigation
The Hoover Company, Plant No. 1, North Canton, OH

		Sample Analyses by Sampling Purpose			
Sample Media	**Sample Interval**	**Typical**	**Confirmatory Characterization**	**Supplemental**	**Contingency**
Soil	0–2'	TAL	App. IX		
	2'–4'			Geotech [2], TOC [2]	App. IX [3]
	4'–6'	TAL	App. IX		
	6'–8'			Geotech [2], TOC [2]	App. IX [3]
	8'–10'	TAL [1]	App. IX [1]		
	10'–12'				App. IX [3]
	>12'				App. IX [3]
	Saturated (~12–14')			Geotech, TOC	
	Other				App. IX [3]
Ground-water	Water Table	TAL	App. IX	Attenuation or Treatability Param. [5]	
	Intermediate				TAL or App. IX [4]
	Bedrock Interface	TAL	App. IX	Attenuation or Treatability Param. [2]	

Column Heading Key

Typical Sample Intervals and Analyses will occur at approximately 80% of locations
Confirmatory Characterization Sample Intervals and Analyses will occur at approximately 20% of locations
Supplemental Samples for Geotechnical or Constituent Fate and Transport Analyses will occur at approximately 10% of Sampling Locations
Contingency Sample Intervals and Analyses will be based on field observations

Body of Table Key

TAL = Target Analyte List. See the Appendix A to this work plan for a full listing of TAL constituents
App. IX = RCRA Appendix IX constituents
Geotech = Geotechnical parameters: bulk density, moisture content, particle size, vertical hydraulic conductivity
TOC = Total Organic Carbon

Natural Attenuation Parameters = [field] pH, temperature, conductivity, dissolved oxygen, redox potential ; [lab] total and dissolved iron, dissolved ferric and ferrous iron, manganese, chloride, carbon dioxide, total phosphorous, sulfates, nitrite and nitrate, and methane

Treatability Parameters = [lab] BOD, COD, hardness, ammonia, total Kjeldahl nitrogen, nitrate, nitrite, TDS, TSS, sulfate, sulfide, total and dissolved iron, pH, total organic carbon, and conductivity

Notes on Analytical Suites: The decision trees for the sampling rationale by interval is detailed in the Perimeter Investigation Sampling and Analysis Plan (SAP; CH2M HILL 1999b).

1 = This sample interval may be eliminated if the water table is within or above this interval

2=This unsaturated soil sample will be selected for either the 2-4' or 6-8' interval (but not both) to provide a representative sample of soil conditions

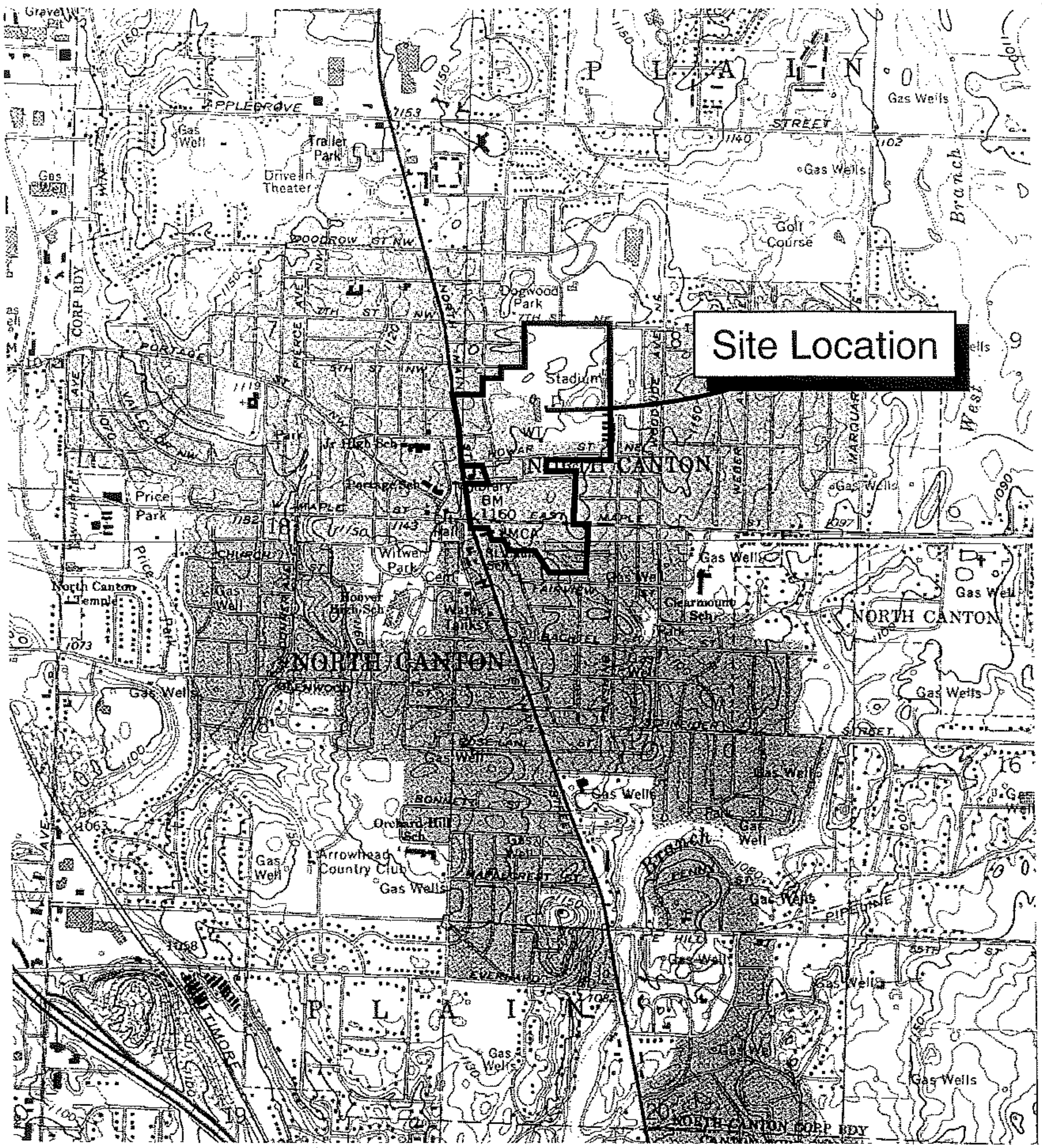
3=A sample may be collected from any one of these intervals at each station. This sample is to be above the water table and will be collected or based on field observations suggesting the presence of waste materials or site-related compounds within the interval not already targeted for sampling

4=A sample of 'intermediate' groundwater may be collected if more than 20 ft. of saturated zone above the bedrock is encountered and a permeable (e.g. - sand and gravel) zone is observed between the water table and the bedrock. Analyses will be the same as for other groundwater intervals.

5=Natural Attenuation and Treatability suite of analyses will be performed at approximately 10% of all stations but both will not be collected from the same location. It will be one or the other.

Other Notes:

The actual number and locations of samples collected may vary depending upon the field conditions and observations at the time of sampling.

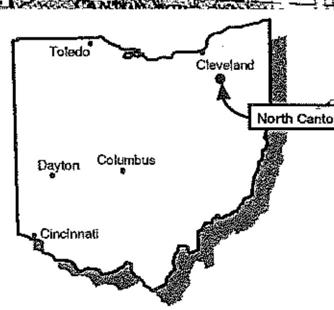


APPROXIMATE SCALE

0 1/2 1

Miles

NORTH



LEGEND

Hoover Facility Detailed on Figure 2-2

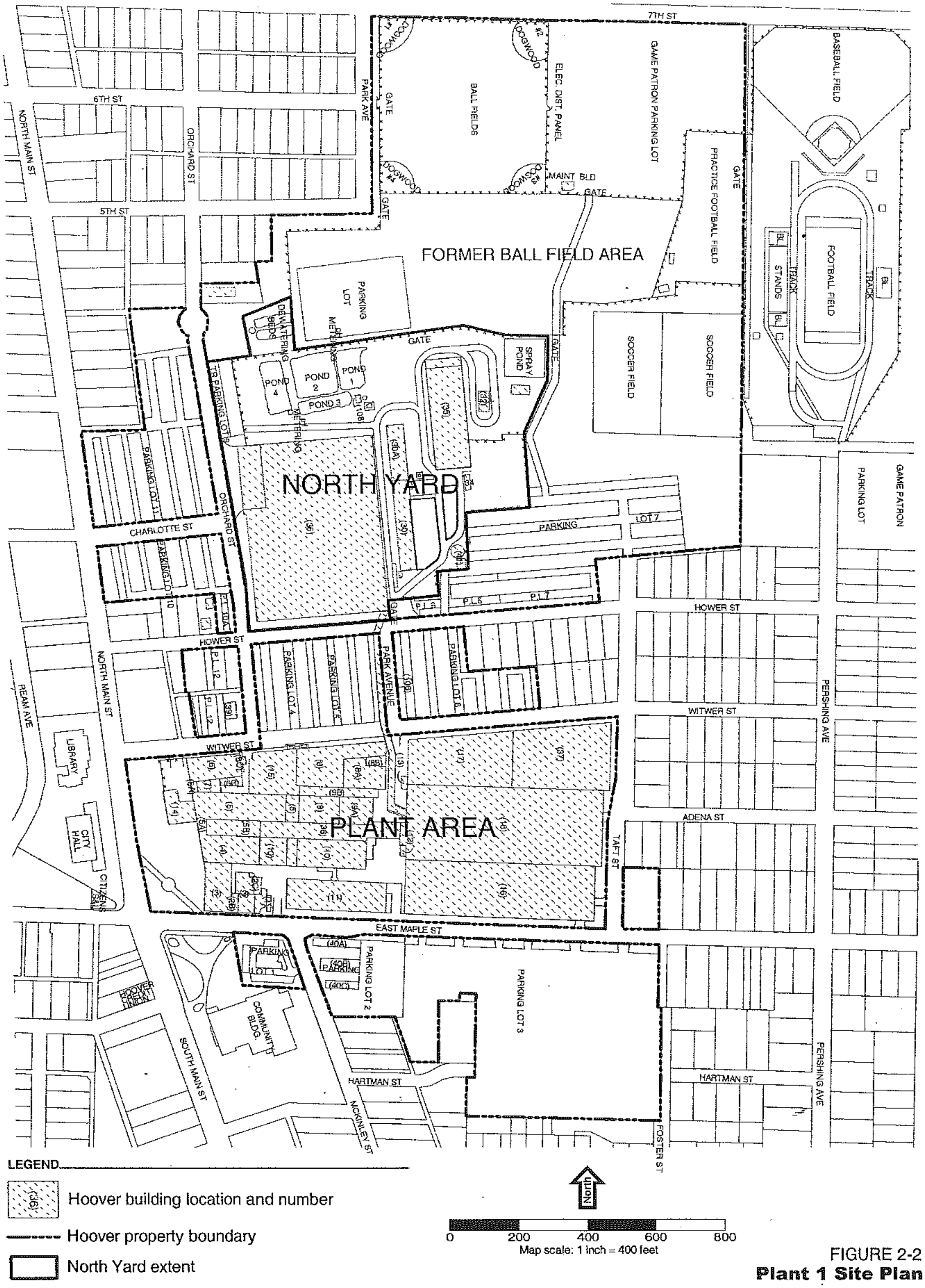
NOTE

Base map adapted from US Geological Survey 7.5 Minute Quandrangle Maps: Canton West, Ohio (revised in 1985) and North Canton, Ohio (revised in 1984).

FIGURE 2-1
Site Location Map
Perimeter Investigation Work Plan
The Hoover Company, North Canton, Ohio

CH2MHILL

E141483.VR.FA Fig2-1a.ppt 12-3-99 mji



LEGEND

- Hoover building location and number
- Hoover property boundary
- North Yard extent

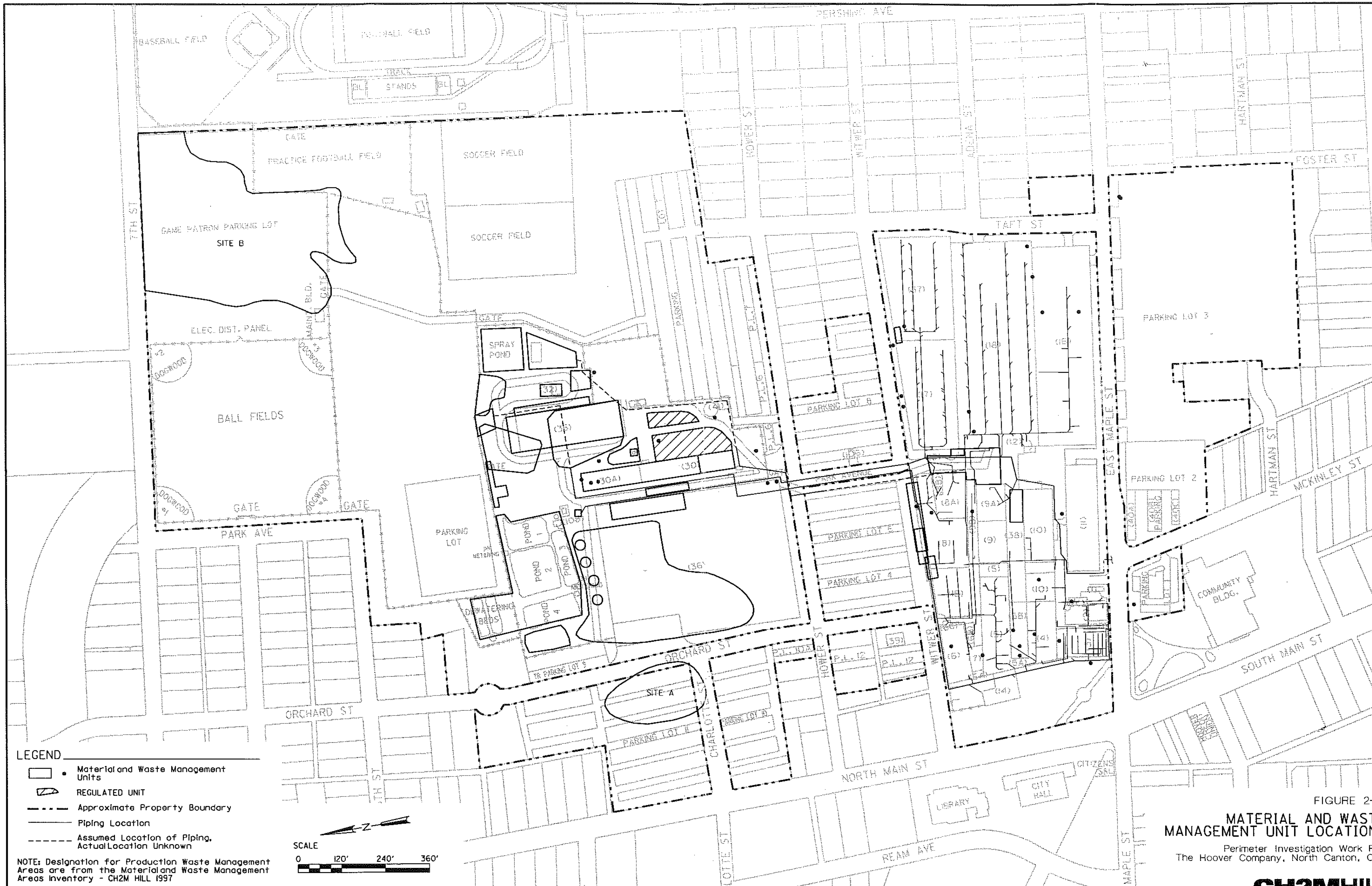
NOTES

1. Base map provided by Hoover Engineering (April 1997).

FIGURE 2-2
Plant 1 Site Plan
PERIMETER INVESTIGATION WORK PLAN
THE HOOVER COMPANY, NORTH CANTON, OHIO

CH2MHILL

ANTIGONE/j:/hoover/hoover project/perimeter investigation/work plans/Site_plan_ltr.srl 10/28/99



LEGEND

- Material and Waste Management Units
- REGULATED UNIT
- Approximate Property Boundary
- Piping Location
- Assumed Location of Piping, Actual Location Unknown

NOTE: Designation for Production Waste Management Areas are from the Material and Waste Management Areas Inventory - CH2M HILL 1997

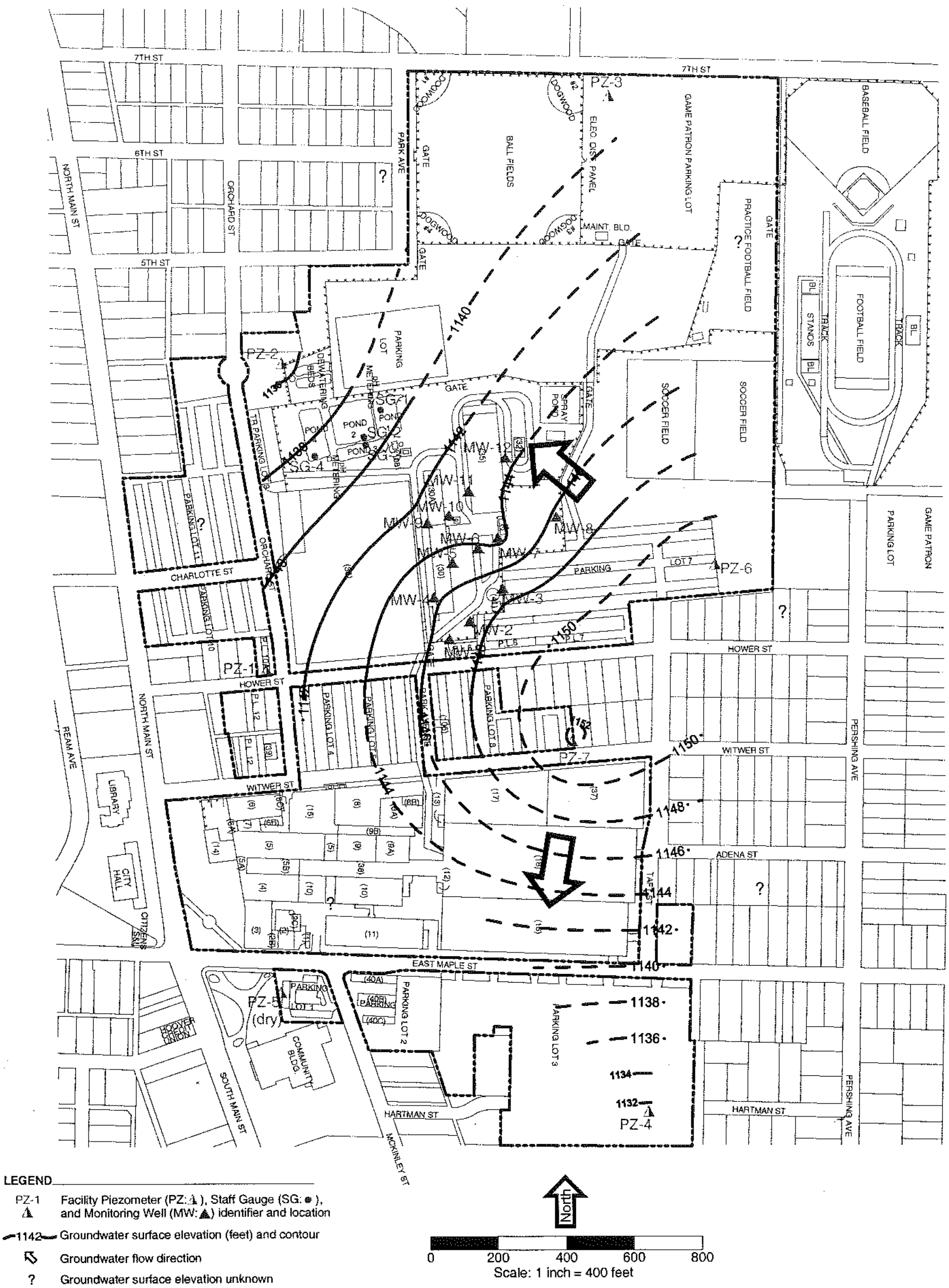
SCALE 0 120' 240' 360'

N

148304a.dgn View: WP23
03-FEB-2000

FIGURE 2-3
MATERIAL AND WASTE MANAGEMENT UNIT LOCATIONS
Perimeter Investigation Work Plan
The Hoover Company, North Canton, Ohio

CH2MHILL



LEGEND

PZ-1 — Facility Piezometer (PZ:), Staff Gauge (SG:), and Monitoring Well (MW:) identifier and location

1142 — Groundwater surface elevation (feet) and contour

Groundwater flow direction

? — Groundwater surface elevation unknown

---- Property boundary

NOTES

1. All monitoring wells and piezometers, but none of the staff gauges, were used in interpreting the groundwater surface.
2. Contours are dashed between points separated by a distance greater than 1,000 feet.
3. Base map provided by Hoover Engineering (April 1997).

FIGURE 2-4

Groundwater Surface Measured on 5/5/99

PERIMETER INVESTIGATION WORK PLAN
THE HOOVER COMPANY, NORTH CANTON, OHIO

CH2MHILL

ANTIGONE/j:/hoover/hoover projects/perimeter investigation/work plan/pz0599 gw flow map.srf 09/07/99

FIGURE 3-1

Proposed Perimeter Sampling Locations

Perimeter Investigation Work Plan
The Hoover Company, North Canton, Ohio

CH2MHILL

WP 148304.dgn Antigone/Hoover/155441 VCA Project/Cad
03-FEB-2000

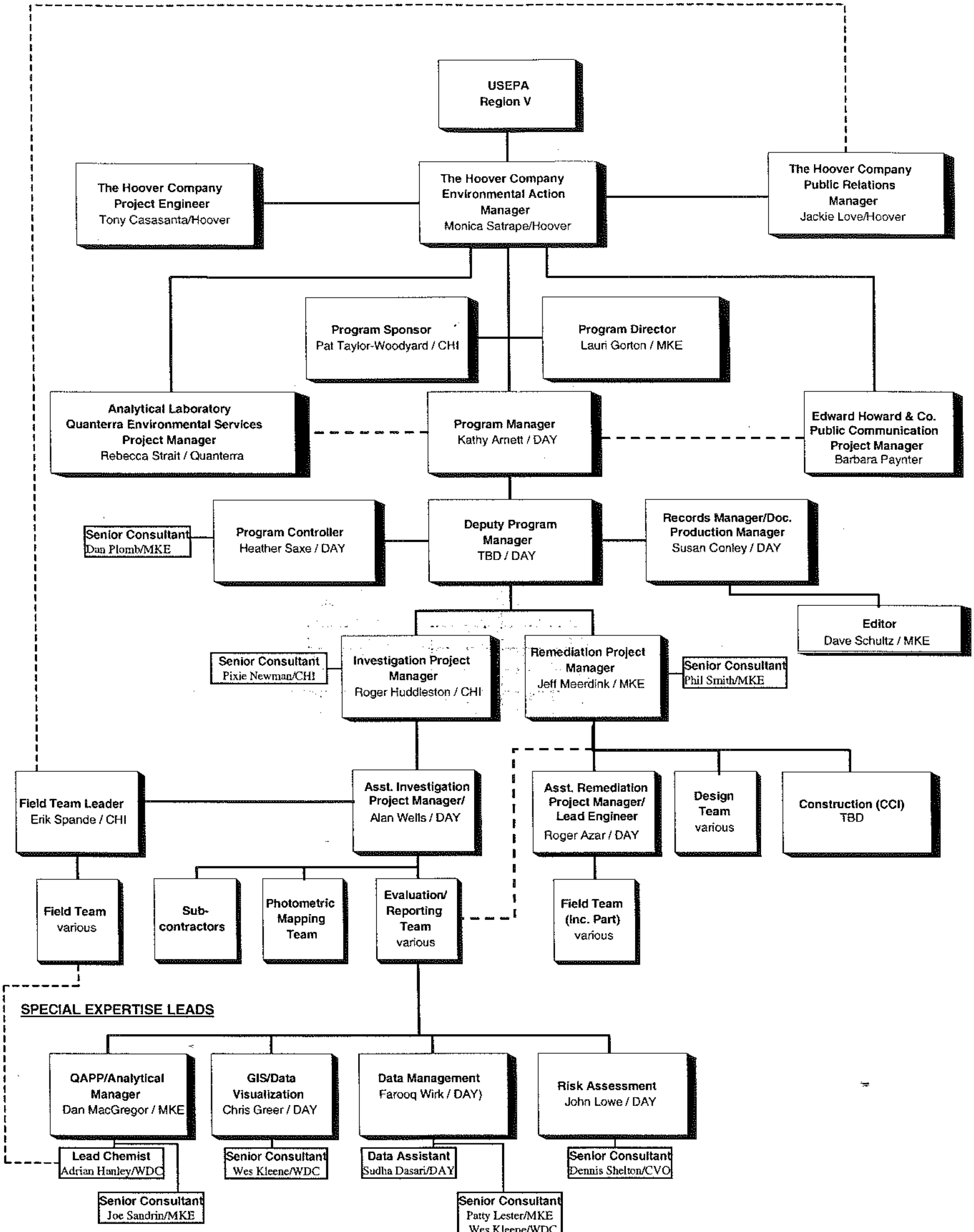


FIGURE 4-1
Hoover VCA Program Management Structure
The Hoover Company, North Canton, Ohio

CH2MHILL

Antigone\Hoover\155441.G1.OrgChart.ppt

ID	Task Name	Duration	Start	Finish
1	**A2 - Perimeter Surface & Soils**	**190 days**	**Mon 07/12/99**	**Fri 03/31/00**
2	**.PL - Planning**	**181 days**	**Mon 07/12/99**	**Mon 03/20/00**
3	.01 Strategy	46 days	Mon 07/12/99	Mon 09/13/99
4	.02 - Meetings	181 days	Mon 07/12/99	Mon 03/20/00
5	**.03 - Workplan Preparation**	**81 days**	**Mon 07/12/99**	**Mon 11/01/99**
6	Workplan	81 days	Mon 07/12/99	Mon 11/01/99
7	SAP	56 days	Mon 08/16/99	Mon 11/01/99
8	QAPP/SOW	36 days	Mon 09/13/99	Mon 11/01/99
9	H&S Plan	81 days	Mon 07/12/99	Mon 11/01/99
10	**.04 - Subcontracting**	**88 days**	**Mon 07/26/99**	**Wed 11/24/99**
11	Trailers	54 days	Mon 08/16/99	Thu 10/28/99
12	Drilling	78 days	Mon 07/26/99	Wed 11/10/99
13	Mapping	16 days	Wed 11/03/99	Wed 11/24/99
14	Surveying	83 days	Mon 07/26/99	Wed 11/17/99
15	**.IP - Implementation**	**80 days**	**Mon 11/08/99**	**Fri 02/25/00**
16	**.01 - Pre-Fieldwork, Mobilization & Site Prep.**	**3 days**	**Mon 11/08/99**	**Wed 11/10/99**
17	Utility Clearance	1 day	Mon 11/08/99	Mon 11/08/99
18	Site Visit	1 day	Wed 11/10/99	Wed 11/10/99
19	**.02 - Surveying**	**36 days**	**Wed 11/17/99**	**Wed 01/05/00**
20	Surveying	32 days	Wed 11/17/99	Thu 12/30/99
21	Photomapping	31 days	Wed 11/24/99	Wed 01/05/00

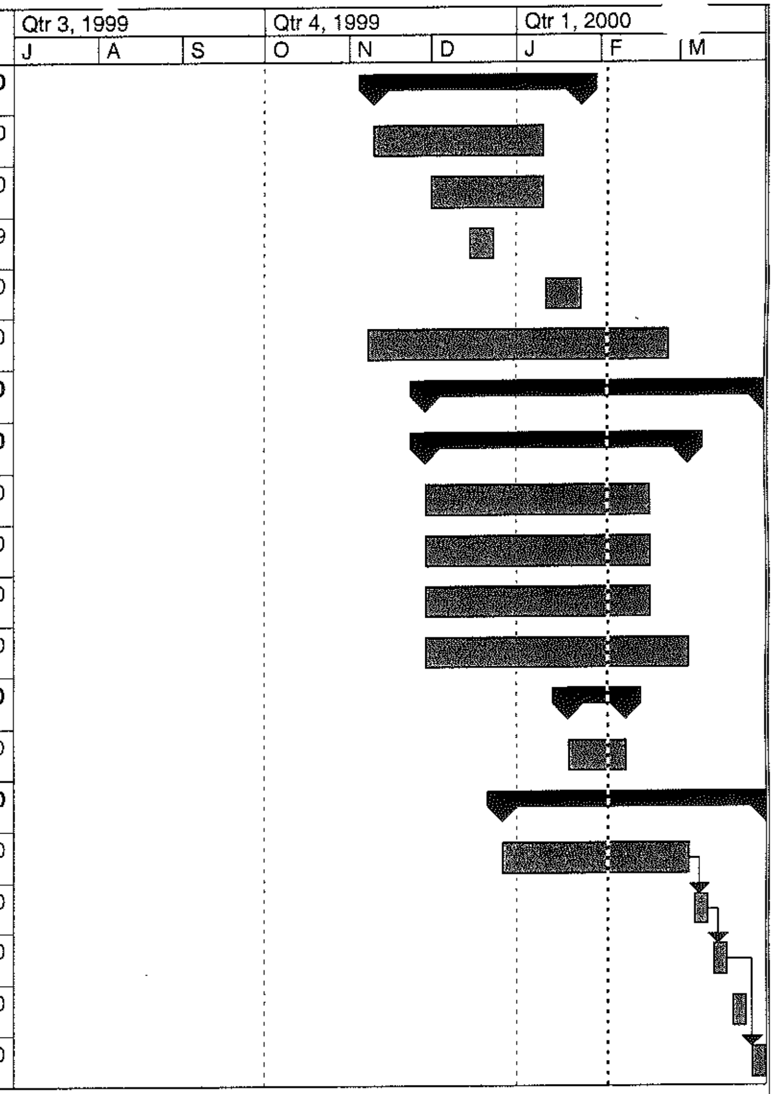
Project: HOOVERsched
Date: Thu 02/03/00

Task | Split | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Split | Rolled Up Milestone | Rolled Up Progress | External Tasks | Project Summary

[Antigone] J:\Hoover\#155441-VCA Project\(A)\{2}\{IP}\{03}\Schedule\HOOVERsched_WP.mpp

Figure 4-2
Perimeter Investigation Schedule
The Hoover Company, North Canton, Ohio

ID	Task Name	Duration	Start	Finish
22	**.03 - Sampling**	**54 days**	**Wed 11/10/99**	**Mon 01/24/00**
23	Perimeter Sampling	44 days	Wed 11/10/99	Mon 01/10/00
24	Monitoring Well Installation	29 days	Wed 12/01/99	Mon 01/10/00
25	Contingency Surf. Soil & Perimeter Sampling	7 days	Wed 12/15/99	Thu 12/23/99
26	Monitoring Well Sampling & Testing	9 days	Wed 01/12/00	Mon 01/24/00
27	.04 - Subcontract Management	80 days	Mon 11/08/99	Fri 02/25/00
28	**.ER - Evaluation & Reporting**	**90 days**	**Mon 11/29/99**	**Fri 03/31/00**
29	**.01 - Data Management & Visualization**	**70 days**	**Mon 11/29/99**	**Fri 03/03/00**
30	Data Evaluation	60 days	Mon 11/29/99	Fri 02/18/00
31	Data Analysis	60 days	Mon 11/29/99	Fri 02/18/00
32	QA/QC	60 days	Mon 11/29/99	Fri 02/18/00
33	Data Visualization/GIS	70 days	Mon 11/29/99	Fri 03/03/00
34	**.02 - Risk Evaluation**	**15 days**	**Thu 01/20/00**	**Wed 02/09/00**
35	Human Health	15 days	Thu 01/20/00	Wed 02/09/00
36	**.03 - Report Prep.**	**70 days**	**Mon 12/27/99**	**Fri 03/31/00**
37	Internal Draft	50 days	Mon 12/27/99	Fri 03/03/00
38	Internal Review	5 days	Mon 03/06/00	Fri 03/10/00
39	Client Draft	5 days	Mon 03/13/00	Fri 03/17/00
40	Client Review	5 days	Mon 03/20/00	Fri 03/24/00
41	Final Report	5 days	Mon 03/27/00	Fri 03/31/00

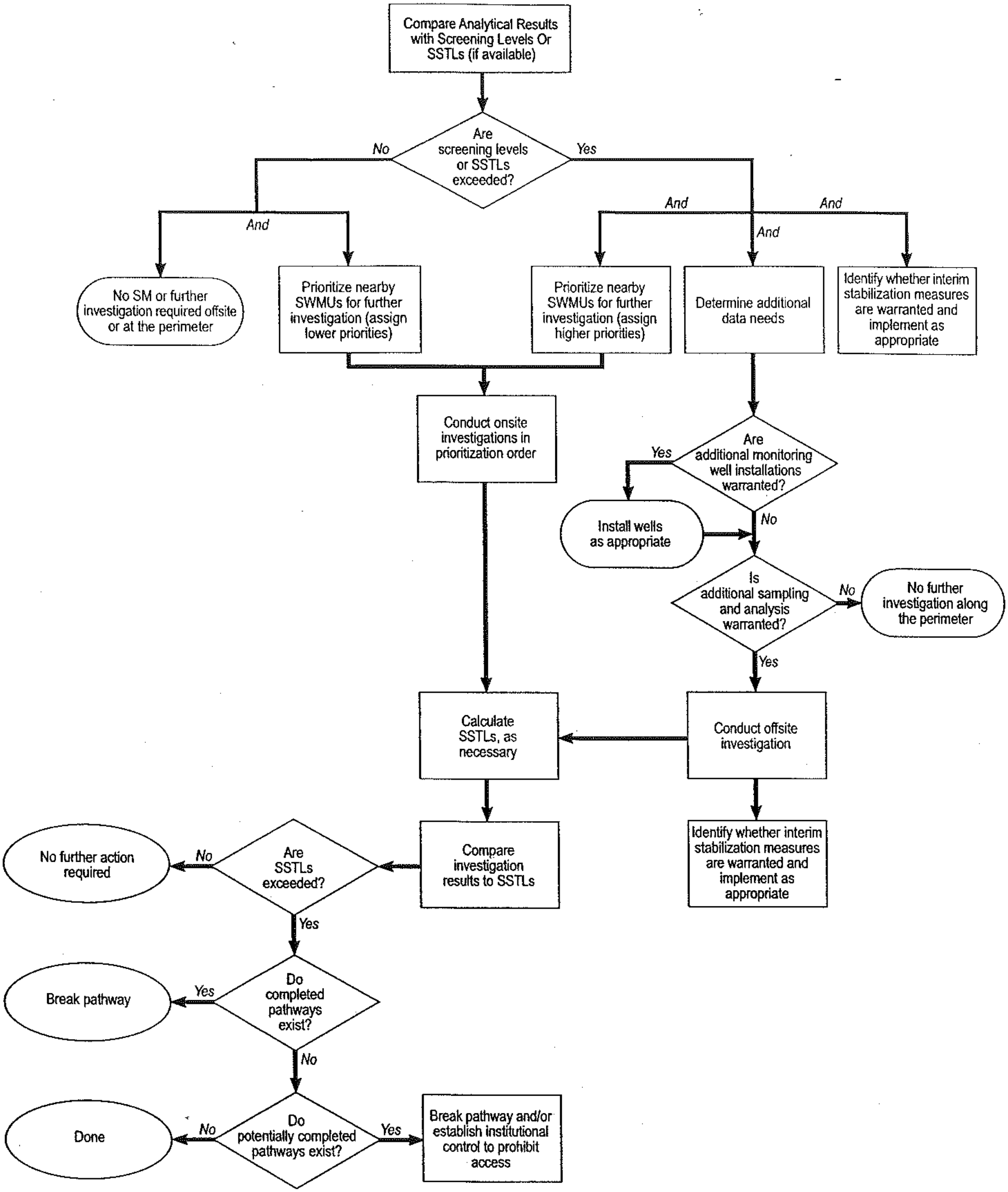


Project: HOOVERsched
Date: Thu 02/03/00

Task
Split
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Split
Rolled Up Milestone
Rolled Up Progress
External Tasks
Project Summary

[Antigone] J:\Hoover\#155441-VCA Project\(A)\{2}\{IP}\{03}\Schedule\HOOVERsched_WP.mpp

Figure 4-2
Perimeter Investigation Schedule
The Hoover Company, North Canton, Ohio



LEGEND

SSTL Site Specific Target Level
SM Stabilization Measure
SWMU Solid Waste Management Unit

FIGURE 4-3
Data Screening Process
Perimeter Sampling Work Plan
The Hoover Company, North Canton, Ohio

E153725.PM.T2 Figure 4-3 9-13-99 mjl

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